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Original Articles.

RELATION OF THE DEEP CUL-DE-SAC TO PROLAPSE OF THE RECTUM AND UTERUS, AND TO RECTOCELE.*

By Daniel Fiske Jones, M.D., Boston.

The difficulty of curing a disease is generally in proportion to the number of "cures" for it, and prolapse of the rectum is no exception to this rule. Few surgical conditions are less satisfactory to treat, as will be seen by looking over the records of the operated cases.

Before taking up the subject it will be well to state that this paper does not consider the cases under ten years of age, as I believe the problem is quite different in children than in adults. The term "prolapse" in this paper is intended to include those cases only in which there is a protrusion into or through the sphincter of the whole rectal wall.

It might be stated at this time also that I have practically nothing new to present in this paper; I am simply bringing to your attention facts already stated to which little or no attention has been paid. For about a year before Moschcovitz' article came out in 1912, I thought that I had made a discovery. In his paper, Moschcovitz intimates that he thought he was getting out something original, but found that Waldeyer, Ludloff, Zuckerkandl, and others had described very accurately the pathological anatomy of the condition, and that Bardenheuer in 1902, and Quénu and Duval in 1909 had published operations very similar to the one he advocated.

If the operations devised for the cure of prolapse of the rectum are taken as evidence, little notice was taken of the work of Zuckerkandl, Ludloff and others, up to the time of Bardenheuer's operation in 1902, as practically all the operations were devised for the purpose of tightening up the sphincter and levators, and narrowing the anal canal so that the prolapse could not get through it. It is a fact that the sphincter and levators are stretched and relaxed to a marked degree in all these cases. That this is not the cause of the prolapse can, I think, be easily demonstrated by an examination of any case in which the prolapse has been held reduced for a few weeks or months, for in these cases the sphincter and levators have regained a normal tone, and are as taut as in any normal individual.

To get a different conception of prolapse of the rectum, let us go back to the work of Zuckerkandl in 1890, Waldeyer in 1899, and to Dix, Ludloff, and others. The idea of these men, based upon anatomical findings, that prolapse of the rectum is a hernia through the sphincter, seems to have made little impression, as Bardenheuer in 1902 was, so far as I can find, the first to make use of the idea. To run over very briefly the work of Zuckerkandl, Moschcovitz, and Williams, will be necessary to an understanding of the condition.

The normal pelvis in the male shows a posterior cul-de-sac which reaches to the 2d or 3d sacral vertebra. In multiparae the depth of the cul-de-sac is on a level with the posterior portion of the vaginal vault (Zuckerkandl). In males it reaches just about to the top of the seminal vesicles (Zuckerkandl).

The transversalis fascia, which lines the abdominal cavity, is continued into the pelvis fascia where it gives support to the pelvic organs. Bardeleben shows this fascia as extending backward in front of the bladder, upward between the bladder and rectum, surrounding the structures at the base of the bladder, then running backward around the rectum to the posterior layer of pelvic fascia.

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* Read at a meeting of the Boston Surgical Society, March 6, 1916.

Williams says, "The pelvic fascia, from its attachment at the brim of the pelvis, sweeps downward and inward to the bladder, with which it is intimately connected, and to the vagina which it splits to enclose, uniting with the fascia from the opposite side, and is attached to the cervix uteri, where it helps to form the vaginal vault. This forms a strong fibrous sling which is the main support of the bladder, and the strongest of the uterine supports. The posterior portion of the fascia is deeper than the anterior, and passes downward and inward to the rectal wall to which it is intimately attached. Posterior to the rectum it covers the pyriformis and is continuous above with the anterior lamella of the lumbar fascia." It is this fascia which Williams says is the support of the uterus, vagina, and bladder. It is, we believe, this fascia which limits the depth of the posterior cul-de-sac. It is this fascia, called by various names in different parts of the abdomen, which has particularly to do with herniae, according to Moschcovitz' view. It is behind all vessels and there is a more or less funnel-shaped prolongation onto every vessel, and every organ leaving the abdomen or pelvis. It is this fascia which supports the pelvic organs and the floor of the posterior cul-de-sac. It is a defect in this fascia, the absence of it, or the stretching of it which is responsible for the extension of the cul-de-sac downward to the levator muscles. Zuckerkandl states that a deep posterior cul-de-sac is essential to the formation of perineal, rectal, and vaginal herniae. The manner of formation of the deep cul-de-sac is of interest. It is, we believe, either congenital or acquired.

Zuckerkandl, Freund, and others have shown that this cul-de-sac normally extends to the levators in the foetus, and that the depth is gradually decreased from this time to puberty, when it reaches to the level of the 2d or 3d sacral vertebra.

Moschcovitz believes that the fascia is normally attached to the rectum by a funnel shaped extension downward on to it. A defect in this attachment allows the intestines to push downward along the rectum to the levators. The defect, he believes, to be congenital but the sac or deep cul-de-sac is acquired.

Another acquired form is that found in multiparae, due to the stretching of the peritoneum and fascia.

Clinically, there are three distinct varieties of deep cul-de-sac. The first is the variety which we distinguish as congenital, in which the peritoneum lining the deep pelvis is smooth and closely adherent to the walls of the pelvis and to the rectum and vagina or bladder; the rectum instead of standing out as a definite organ is usually flattened against the sacrum and coccyx, and scarcely distinguishable from the peritoneum. The bladder in males, instead of being a rounded organ occupying the central portion of the pelvis, is flattened posteriorly and at the base, and extends from one side of the pelvis to the other. There is absolutely nothing to indicate the depth of the normal cul-de-sac. This variety is found in the cases of prolapse of the rectum in males and virgins, and in prolapse of the uterus and vaginal herniae in virgins. I have rarely seen a deep pelvis of this form in which there was not either a prolapse of the rectum or uterus, or a rectocele.

In the second form, which we have called the acquired variety, the cul-de-sac is deep, but does not appear so deep as in the first; the peritoneum is redundant and is not adherent to the pelvic walls, rectum and vagina, or bladder. The rectum, instead of being flattened against the posterior wall, stands out distinctly in the pelvis. This form is of frequent occurrence in multiparae, yet the occurrence of prolapse of the rectum is very rare, while prolapse of the uterus and large rectoceles are infrequent in proportion to the number of cases of this acquired deep cul-de-sac.

The third variety is very rare; in these cases there is a small opening between the vagina and rectum reaching from a posterior cul-de-sac in normal position down to the levators, and usually causing a vaginal protrusion. The appearance of this variety would suggest a defect in the posterior portion of the pelvic fascia, through which the intestines had forced their way to the depths of the pelvis. The comparatively small opening with a distinct floor of the posterior cul-de-sac at its normal height suggests the protrusion through a small defect in the fascia, as suggested by Moschcovitz as the cause of the deep cul-de-sac, and exactly analogous to the formation of an inguinal hernia.

We have for some time tried to find an explanation of the large proportion of prolapses and vaginal herniae in the first group, that is, congenital variety, as compared with the small proportion found in the second group, that is, acquired variety.

It is our belief that there is not only a congenitally deep cul-de-sac, but that there is an absence of fascia lining the cavity in the congenital group, while in the second group the fascia is stretched by the gravid uterus and childbirth sufficiently to allow the peritoneum to sink into the depths of the pelvis but still leaves it attached to the vagina and rectum. In the first group there is no fascia, the constant pressure of the intestines is against the levators, anterior wall of the rectum and posterior wall of the vagina, and as muscle fibres will not stand a long continued pressure without stretching, these parts soon give way, and are pushed through the sphincter or out through the vulva. In the second group the fascia, while stretched and thinned, is sufficiently strong to take the strain without stretching. As the anterior rectal wall is stretched downward against the sphincter, they both must give more and more until the rectal wall pushes through the sphincter. The prolapse, when first formed, is always the anterior rectal wall, and as this progresses, the posterior wall is loosened sufficiently to be pulled down also. In place of the rectal wall giving way, the posterior vaginal wall may be stretched, and we have either a rectocele, so called, or a vaginal hernia.

In regard to rectoceles, we believe that there are two distinct conditions which are designated as rectocele. In virgins, the rectocele is always a protrusion of the posterior vaginal wall caused by the intestines in the deep posterior cul-de-sac pushing the wall forward and downward, that is, it is a hernia. The rectum has nothing whatever to do with it, except that the rectum is pulled downward by the lower portion of the posterior wall as it is everted.

In some multiparae with badly torn perineum, and stretched posterior wall of the vagina, we have what may be called a true rectocele, that is, the rectum, having no support anteriorly, bulges into the vagina. The bulging increases very little, because the intra-rectal pressure can be little much of the time.

The second variety occurs in those cases in which there is a deep posterior cul-de-sac; the intestines force their way downward between the rectum and vagina, and push the posterior wall of the vagina forward and downward. It is, therefore, the intestines in this cul-de-sac which are bulging into the vagina, and not the rectum. If the surgeon after doing a perineorrhaphy on a well-marked case of "rectocele," will open the abdomen and examine the posterior cul-de-sac, he will easily feel his sutures at the lower end of the cul-de-sac, and will still be able to push the posterior wall of the vagina forward over them.

Little has been said of prolapse of the uterus in these conditions of deep posterior cul-de-sac. The uterus is suspended by the anterior portion of the pelvic fascia to some extent, so that even with the loss of support of the posterior portion the uterus does not prolapse at once. The constant pressure of the intestines on the posterior vaginal wall, not only pushing it forward, but forcing it downward toward the vulva, at the same time exerts a considerable pull upon the uterus; this, in addition to the loss of support of the posterior fascia, causes prolapse of the uterus in many cases. It is probable also that the anterior fascia is defective in those cases in which the posterior portion is thus aiding in the prolapse.

It has been my good fortune to see four virgins within the last two years with what I believe to be a congenital deep posterior cul-de-sac. The condition in the pelvis was indentical in all. In one there was a prolapse of the rectum, in another there was a prolapse of the rectum, a large "cystocele" and a prolapse of the uterus. In two others there was a "rectocele" and a prolapse of the uterus.

Granted then that prolapse of the rectum, rectoceles, and prolapse of the uterus are caused by deep posterior cul-de-sac and are really herniae, what is the proper treatment for them? For prolapse of the rectum the operations which have been done may be divided into three groups.

1. Those which attempt to prevent the prolapse by supporting the outlet of the pelvis or by narrowing the outlet.
2. Those which attempt to prevent the prolapse by fixation of the bowel above or bring about the same result by amputation of the prolapsed portion.
3. Those which not only suspend the bowel but close the hernial sac at what might be called the internal ring.

Let us consider these operations in groups to save time, taking up only a few special operations; and let us admit for the sake of argument that prolapse of the rectum and uterus are herniae; and we must admit that they are at the time they become fully developed prolapses, whether we believe that the deep cul-de-sac is the cause or the effect of the prolapse.

In the first group we put those operations which attempt to prevent the prolapse or hernia by narrowing the outlet or by supporting the perineum. The evident fact in cases of prolapse is the dilated and atonic sphincter, and a relaxed perineum. The obvious thing to do, therefore, is to tighten up the sphincter, and give more support to the perineum.

In comparing this group of operations with an inguinal hernia, it is evident that the placing of a band about the sphincter is almost exactly similar to closing of the external ring by a suture. Undoubtedly this will hold up a certain number, and so will closure of the external ring prevent a certain number of inguinal herniae from protruding.

The support given to the perineum is similar to tightening up the external oblique fascia, without removing the sac, and this, of course, means a recurrence.

The Tiersch operation of placing a silver wire about the anus is undoubtedly of value in very old or very feeble patients.

The Delorme-Juvara operation of removing a collar of mucous membrane apparently gives excellent results, comparatively speaking, but there is some danger about it—6% mortality according to Delorme,—and the end-results, while excellent, according to Delorme, are not sufficiently good to consider it the operation of choice. Quénu considers it an excellent adjuvant to the abdominal operation.

In the second group we have operations which might be compared to pulling the hernial sac up as far as the external ring, and leaving it open above. While most of these operations do give support to the rectum for a time at least, they overlook a very important fact, that is, the rectum at its lower segment has been so stretched by pressure upon it that no amount of pull above will take up the slack here. Besides that, the intestines are free to continue their pressure upon the anterior wall, and ought, in time, to reproduce the prolapse, if it does not immediately.

It will be seen, then, that according to our estimate at least, the operations in Groups 1 and 2 are, at least theoretically, wrong. We must, therefore, find some operation which will be more satisfying, at least theoretically.

In 1912, after a recurrence following the so-called Tuttle posterior rectopexy, and having a patient transferred to me with a recurrence following the same operation done by a colleague, I determined to do a colopexy. The first thing which struck me when I opened the abdomen was the great depth of the pelvis; there was no posterior cul-de-sac at all, the pelvis to the levators was wide open, the rectum was flattened against the sacrum, and the peritoneum evidently rested upon the levators; the sphincter could be easily felt from the cul-de-sac. An attempt was then made to pull the rectum into place by pulling upon the sigmoid, in preparation for a colopexy, but to my surprise I found that a pull upon the sigmoid pulled upon the attachment of the rectum only, and did not pull upon the lower three inches of the rectum itself.

The next patient was a male, and the pelvis presented a most extraordinary appearance. The depth of the pelvis was most striking; it also had the appearance of having no organ in it, for the rectum was flattened out against the posterior surface, and was not easily distinguished from the peritoneum. The bladder, which is ordinarily a rounded organ, had a flattened base, which extended from one side of the pelvis to the other. The seminal vesicles and prostate were pelvic organs, that is, in the portion lined by peritoneum.

As colopexy seemed to offer no hope of curing these patients, an effort was made to restore the cul-de-sac to its normal appearance, by closing it with purse-string sutures of silk; in addition to this, the rectum was attached to the pelvic peritoneum on either side, as high as the promontory, by silk sutures, in the hope of getting support from many attachments to the peritoneum.

In the female, in addition to closing the posterior cul-de-sac, the rectum was sutured to the posterior surface of the vagina and uterus, and a ventral fixation done.

It is true that in closing the posterior cul-de-sac, in this way, one is probably suturing nothing but peritoneum, and therefore does not feel that the results can be very permanent. It is very necessary, therefore, to make every effort possible to prevent recurrence. In our cases the posterior cul-de-sac was closed and the rectum attached to the pelvic peritoneum as high as the promontory. Moschcovitz simply closes the cul-de-sac.

Bardenheuer closed the posterior cul-de-sac and attached the mesentery of the rectum to the pelvic peritoneum from right to left.

Quénu and Duval closed the posterior cul-de-sac, then sutured the rectum to the posterior surface of the bladder or vagina on the right, then across to the left side of the pelvis, where a slit was made in the peritoneum over the psoas, and the sigmoid sutured to the edges and to the iliac fascia beneath. The value of this procedure is, we believe, overestimated by them, as it is impossible for the sigmoid sutured in this way to exert any pull upon the lower portion of the rectum. It is, we believe, an excellent way of making the closure of the cul-de-sac more sure.

Quénu states that other operations, such as the Delorme-Juvara, or the Tiersch, may be necessary adjuvants to their operation.

It is, we believe, important in many of these cases, especially the large prolapses, to do something else than closure of the cul-de-sac, to aid in the support. At times removal of mucous membrane with the cautery will assist. In many we are convinced that posterior rectopexy will be of great value. While the giving way of the posterior attachment is not the cause of prolapse, the posterior attachments are loosened and pulled down late in the course of the prolapse. Fixation, therefore, of this portion of the rectum must be of some value in holding up the rectum.

In closing the posterior cul-de-sac, it must be remembered that the anterior wall of the rectum is well stretched, and in order to prevent this portion from prolapsing, it must be drawn well up in the pelvis by a guide suture placed as low as possible into the rectum, and this portion fixed as high as possible. While the dangers of closing the posterior cul-de-sac, that is, injury to the ureters and to the great vessels, may seem considerable, we have had no complication in about twenty cases.

As to the operation for rectocele and prolapse of the uterus, the operation is identical in every detail to that for prolapse of the rectum. We do not believe it necessary or advisable to do an abdominal operation for every rectocele, for our present methods are satisfactory. In large rectoceles, and in smaller ones, when the abdomen is opened for some other purpose, the closure of the cul-de-sac is rational, and we believe, essential, to prevent recurrence in many cases.

In all cases of prolapse of the uterus in virgins, there is, we believe, a deep posterior cul-de-sac of the congenital type. What other conditions there are to cause the prolapse, we do not know. The rational procedure in these cases would seem to be closure of the deep cul-de-sac, the one condition present in all cases, in addition to ventral fixation. Not only do we believe this essential for the permanent cure of these cases, but we believe it necessary to prevent prolapse of the rectum or vaginal hernia later in life.

W. A. Freund, recognizing the relation of the deep cul-de-sac to prolapse, inverted the uterus into the cul-de-sac and sutured it to the sacrum.

In cases of prolapse of the uterus in multiparae, while we believe that stretching of the fascial supports has more to do with prolapse than deep cul-de-sac, we believe that closure of the cul-de-sac will lead to much better results. If the operator will make pressure downward in the cul-de-sac against the posterior wall of the vagina, he will see at once the great pull which can be exerted upon the uterus. If he will then close the posterior cul-de-sac and make pressure upon that, he will, we are sure, be convinced as to the value of closing the cul-de-sac in these cases. If one does not believe in its efficacy in prolapse of the uterus, the closure should be made to prevent the possibility of prolapse of the rectum and posterior vaginal wall.

While closure of the posterior cul-de-sac by purse-string sutures may seem to have little strength, its great value lies in the fact that the closure throws the weight of the intestines forward onto the bladder, symphysis, and anterior abdominal wall, when the patient is in the upright position, as pointed out by Dr. Edward Reynolds, while the deep cul-de-sac allows the weight of the intestines and pressure to come upon the anterior rectal wall or posterior vaginal wall.

THE EFFECT OF ALCOHOL IN THE RATE OF DISCHARGE FROM THE STOMACH.

By L. T. Wright, M.D., Atlanta, Ga.

[From the Laboratory of Physiology in the Harvard Medical School.]

The methods employed to determine the rate of discharge of the gastric contents into the intestine have in the past been so unreliable that judgments based on them are not worthy of great credence. The results have been expressed in terms of "gastric motility," a rather vague expression which properly means the activity of the stomach wall in muscular contraction. Gastric peristalsis is only one of the elements of gastric discharge, however, because peristalsis is obviously ineffective if the pylorus is held tightly closed. Thus there may be a high degree of "gastric motility" with no discharge, as, for example, in pyloric stenosis. In spite of its rather loose employment, the term "gastric motility" has probably in most instances been intended to signify the efficacy of the stomach as an organ discharging its contained food.

Some previous observers have stated that alcohol in "moderate" doses increases gastric motility, whereas greater quantities or concentrations have the opposite effect. This is the testimony, for example, of Klemperer[1] and of Kast.[2] Others have declared that its influence is solely as a depressant,[3] and still others have claimed that it has a stimulating effect.[4] Because of these differences of testimony it seemed worth while to seek further evidence regarding the effect of alcohol in the rate of gastric emptying.

The method used was that first devised by Cannon.[5] Its reliability has been substantiated by other investigators, especially by workers in Magnus's laboratory of pharmacology in Utrecht. In brief, the procedure was as follows: Medium sized, quiet cats, deprived of food for 24 hours, were fastened to a holder and fed through a stomach tube attached to a syringe, 25 cc. of mushy potato to which had been added 5 grams of bismuth subcarbonate. If the cats had eaten within 24 hours before the feeding, the rate of discharge was apparently slowed. Fully 25 cc. should be given at each feeding—an amount which causes the stomach in most cats to cast about the same size of shadow. In a few animals the stomachs seemed dilated; and 25 cc. of the potato-bismuth mixture left light areas here and there, as if the organ was not filled. Both peristalsis and the rate of discharge in these animals, however, were normal. The consistency was, so far as possible, uniform—the potato was mashed till of fine, soft consistency and then made mushy by the addition of water, and also of alcohol.

After being fed the animal was immediately released. X-ray observations of the gastric and intestinal shadows were made first at the end of a half-hour, then at the end of an hour, and thereafter hourly until four hours after the feeding. All observations were fluoroscopic, but records were made by tracing on translucent paper the shadows of the intestinal contents. As explained by Cannon, with proper precautions to avoid overlapping of shadows, and with due care in making the tracings accurate, the aggregate length of the shadows in the successive records may be utilized to indicate the rate of gastric discharge.

I first tested the method and my own use of it by making observations on six animals fed the potato-bismuth mixture without the addition of alcohol. The following figures, representing in centimetres the aggregate length of the food-masses in the small intestines in these cases at the times indicated, are the results secured:

Hours After Feeding.	½	1	2	3	4
March 6—Cat 1...	12.5	24.0	41.5	20.0	13.5
March 6—Cat 2...	11.0	23.5	38.0	18.5	11.5
March 25—Cat 3...	19.5	25.0	41.2	24.5	18.0
March 25—Cat 4...	10.7	27.5	37.4	30.0	23.0
March 25—Cat 5...	17.0	22.4	39.0	24.0	19.5
March 25—Cat 6...	14.0	23.0	42.0	40.0	35.0
Average......	14.0	24.2	39.5	26.	20.

No more than six cats were observed in this test series because the figures from the different animals agreed so well and because the average figures obtained by me were so near those obtained by Cannon (14, 24, 39.5, 26, and 20 cm. as compared with Cannon's 10, 31, 42, 25, and 21.)

In the experiments with alcohol the commercial 95 per cent. alcohol was employed, though in some of the tests a lower percentage (37 per cent.) was made by dilution with distilled water. In order to avoid loss by evaporation the alcohol was always added to the potato-bismuth mixture just before it was fed to the animals. It was added in two strengths—6 cc. of 37 per cent., and 5 cc. of 95 per cent. The latter combination was less cohesive than the former, and there was a tendency for fluid to separate out from it. It was stirred thoroughly just before being put in the syringe, and the syringe was emptied at once.

The weaker mixture (6 cc., 37 per cent., or about 0.7 cc. per kilo) produced no striking symptoms. There was occasionally a slight unsteadiness in the feet, or perhaps some increase in irritability, as manifested by greater excitement while on the holder and under observation. But this was hard to judge. The stronger mixture (5 cc., 95 per cent., or about 15 cc. per kilo) rapidly caused extreme intoxication. A staggering gait, which appeared soon after the feeding, was followed by quietness, and later, after an hour or two, by stupor. The stupor was accompanied by shallow and, as a rule, slow respiration. In no case did an animal die from the intoxication.

The rate of passage from the stomach of the potato-bismuth mixture to which 6 cc. of 37 per cent. alcohol had been added is shown by the following figures and also graphically by the dashline in Fig. 1:

Hours After Feeding.	½	1	2	3	4
March 4—Cat 1...	22	38	62.5	50	38
March 11—Cat 2...	22.5	39	49	45.5	34.5
March 11—Cat 3...	25	39	58	45.5	43.5
March 17—Cat 4...	18.5	34	48	39	28.5
March 17—Cat 5...	20	28	48	37.5	37.5
March 17—Cat 6...	19	35	48.5	36.5	33
Average......	21	35.5	52.5	42.5	36

Like the normal records for mashed potato these records show a maximal number of centimetres of the food in the intestines at the end of two hours, but the maximum number is 52.5 instead of being in the neighborhood of 40 cm. The increase is notable even at the end of a half hour; 21 cm. is 50 per cent. higher than the average figure for normal conditions (14 cm.), and the figure for an hour is likewise about 50 per cent. above the normal. This relatively small amount of alcohol, therefore, has distinctly an accelerating effect on the rate of gastric discharge and produces a higher maximum than the normal.

I noticed that the gastric peristaltic waves were deep and vigorous. In most cases at the end of three hours no residue remained in the stomach.

When the stronger alcohol (5 cc. of 95 per cent.) is added to the potato-bismuth mixture the aggregate length of the food-masses in the intestines at the times designated was as follows (see also the dotted line, Fig. 1):

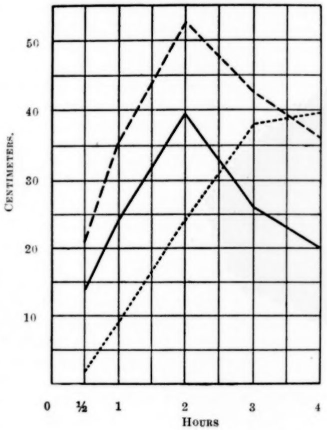

Fig. 1.

Hours After Feeding.		½	1	2	3	4
March 9—Cat	1...	0	0	25.5	36.5	43
"	2...	4.5	20	22	28.5	29
"	3...	3	5.5	23.5	40	44
"	4...	0	16	38.5	46.5	45.5
April 3 "	5...	0	0	0	15.5	25.5
"	6...	0	6.5	22.5	32	29
"	7...	0	0	28.5	47	38
April 10 "	8...	0	14	23.5	41	43
"	9...	0	12	28.5	40	43
"	10...	12	17	23	39	50
"	11...	0	6	27	50	45
Average......		2	9	24	38	39.5

As the figures show, eight of the eleven animals reveal no gastric discharge at the end of a half-hour, and in three nothing had left at the end of an hour. In four other cases on which observations had to be stopped because of a breakdown of the apparatus, three had no gastric discharge at the end of a half-hour, and the fourth had only 5.5 cm. of intestinal content. There is a good deal of variation in the different cases, but the average figures show a slow initial discharge and a gradual rise to a maximum at the end of three or four hours.

These results are in contrast to those obtained either under normal conditions or after giving a smaller amount of alcohol (see Fig. 1). Peristaltic waves when evident were shallow and feeble, and in some of the animals there was present in the stomach at the end of four hours a considerable amount of food.

Cannon has brought forward evidence that gastric discharge is normally dependent on the development of an acid reaction in the contents near the pylorus and a subsequent interplay between effects of acid on either side of the pylorus, acid on the stomach side opening and on the duodenal side closing the orifice.[6] It has been observed that moderate amounts of alcohol stimulate the secretion of gastric juice.[7] The more rapid expulsion of gastric contents when the weaker alcohol was used may have been due not only to a more vigorous peristalsis, but also to a more prompt acidulation of the contents. The retardation of the output when the stronger alcohol was employed was likewise, in all probability, due to effects on both peristalsis and secretion. The profound influence of the stronger alcohol on the central nervous system indicates that the nerves of the gastric wall, and possibly also the muscle fibres, were similarly affected, and the weakness of the peristaltic waves (when *any* were seen) supports that supposition. Pavlov has shown that strong alcohol causes an abundant secretion of mucus, neutral or faintly alkaline in reaction.[8] On the basis of an acid control of the pylorus, therefore, as well as on the assumption of an intoxication of the gastric neuromusculature, it is easy to understand how the stronger alcohol mixed with the food produced so marked a slowing of gastric discharge as was seen in these observations.

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BLOOD TRANSFUSION IN THE GREAT WAR.[*]

By William Reid Morrison, M.D., Boston,

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In military, as well as in civil surgery, blood transfusion holds an important position. It is accepted by most surgeons to be the best treatment for hemorrhage and surgical shock. I wish to emphasize the value of blood transfusion in severe secondary hemorrhages, associated with septic gunshot wounds, so commonly seen in military surgery.

During our service at this base hospital in France, several severe secondary hemorrhages were encountered, usually from infected shrapnel wounds of the extremities.

These patients had lost a good deal of blood, at the time of the initial injury, and as a result, had a low percentage of hemoglobin. They presented the pale, sometimes yellowish color of anemia, with the anorexia and general debility which would be expected in such cases. The temperature was subnormal, or slightly elevated, with more or less rapid pulse, of poor quality and volume, due to lowered blood pressure.

Secondary hemorrhages often occurred spontaneously, or on the removal of gauze packing in wounds near, or involving the main blood vessels. After repeated losses of blood, particularly in amputations of the arms or legs, the patient's blood appeared very watery, not tending to coagulate. The granulation tissue was very pale and boggy, all the more so when hypochlorous solution was used as a dressing. The bleeding point sometimes could be snapped, and tied, more often a general, continuous ooze persisted, despite gauze packing.

Severe hemorrhage repeatedly occurred from the use of more or less rigid, large, rubber drainage-tubes, which had been put in at the front, either spontaneously, from erosion of the blood vessel walls, or on the removal of the drain. Large, pliable, cigarette wicks of gutta-percha tissue, wrapped around gauze, were mainly used by us, for drainage, in these infected wounds, involving areas where there were blood vessels of any size.

The general routine treatment for shock and hemorrhage was carried out; the patient was kept warm with heaters and blankets, while morphine sulphate, one-quarter of a grain, subcutaneously, every four hours, as needed, obtained rest and quiet. The foot of the bed was elevated, if the pulse was high. If there was no vomiting, nourishment in the form of eggnogs custards, milk, champagne, or the less valuable soups, meat extracts, etc., was prescribed freely. In case of nausea, enemata of twenty per cent. glucose, of six ounces each, were given.

Normal salt solution, in lieu of blood, or in conjunction with blood transfusion, may be given subcutaneously, usually under the breast, although the intravenous method is quicker. This raises the arterial tension, and replaces the lost fluids of the body tissues. Too much fluid should not be injected, because it may overtax the heart; furthermore, salt solution does not increase the coagulability of the remaining blood. Rectal tap water may be given drop by drop, or in the form of enemas.

Many of the English medical officers insisted that blood transfusion had no advantages over normal salt solution, and they placed much stress on the possible occurrence of hemolysis, and the transmission of venereal, or other disease, to the recipient.

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[*] Read at a meeting of the East Boston Medical Society, September 29, 1916.

Any of the many hemolysis tests may be made, if one has the available time and apparatus. If the result is negative, well and good; but if positive, hemolysis may occur, although it must be borne in mind that the test is made under very abnormal conditions, and the reverse of the test may take place in the body.

The Wassermann test, with a negative history and physical examination, may rule out syphilis, but in our hospital, few patients had had a Wassermann test, because convoys were coming and going continually, so that there was little time or opportunity to make them.

The following typical emergency cases had neither hemolysis or other blood tests made, on account of lack of time and facilities. Healthy looking donors, who denied having had venereal, or other disease, were accepted, and small amounts of blood were transfused by the indirect, vein to vein method. The Kimpton-Brown two hundred and fifty cubic centimeter glass tubes were used, coated with Vincent's stearin, paraffin and vaseline mixture, consisting of one part of stearin to two parts each of paraffin and vaseline.

If the patient shows no evidence of hemolysis, repeated half-pint doses may be given.

Sterile water or normal salt solution may be used as a coating for the tubes, but the clotting of blood is delayed much longer by the paraffin mixture.

Blood transfusion was done in the following case, both for repeated hemorrhages and to enable the patient to stand the shock of amputation.

Lance Corporal G. F., 2765, of the Fourth Gordon Highlanders, twenty-two years of age, was admitted to the Twenty-second General Hospital on May 3, 1916. He received multiple gunshot wounds of the right leg, on May 1, 1916, while in the front line trenches, and on transfer to the Casualty Clearing Station, he collapsed from loss of blood and shock. The femoral artery and vein were tied off, just above Hunter's canal, where they were injured. On May 3, 1916, he was transferred to the ambulance train, and admitted to this hospital at 10.30 P.M., in Ward A2.

May 4, 1916. Dressings removed, and septic lacerated wound eight inches long on inner aspect, right upper leg, found packed with gauze. Similar deep wounds six inches long, on anterior and posterior aspects of right lower leg, also packed with gauze. The gauze was removed from the wound of the upper leg, and chlorinated soda dressing applied. The packing was removed from the wounds of the lower leg, resulting in profuse hemorrhage from both wounds, not controlled by packing. The anterior and posterior tibial arteries were tied, after enlarging the wounds, and a chlorinated soda dressing applied. Eighteen ounces of normal salt solution were given subpectorally.

Multiple septic shrapnel wounds of the back and loins were dressed with chlorinated soda solution.

The general physical examination was negative, except for marked anemia.

May 5, 1916. Right leg cold, evidently no circulation of blood. General condition poor. Urine negative. Patient takes fair amount of nourishment.

May 6, 1916. Right leg blue, mottled, cold. No pulsation of dorsalis pedis artery. Wounds very septic, discharge foul, despite frequent dressings. It was thought advisable to amputate at mid-thigh, by the surgeon-in-chief, Dr. W. E. Falkner.

With his consent, in order to combat shock, and prevent further bleeding, two hundred and fifty cubic centimeters of blood were transfused by me from Private S. H., a bomb-thrower of the Twelfth King's Liverpool Regiment, who generously offered his blood for his comrade.

Local anesthesia, with one-half per cent. novocain, was used, after the antecubital fossa and surrounding skin had been shaved, scrubbed with soap and water, and alcohol. One inch of the median basilic vein of both donor and recipient was isolated by blunt dissection with scissors, after incision of the skin along the anesthetized area. Two strands of catgut were slipped under the vein of each patient, one to control the flow of blood, and the other to tie off the vein, proximally for the donor, and distally for the recipient.

We do not like to use a tourniquet, as the assistant may forget to remove it, in which event no blood can be forced past it.

The veins are opened by sharp scissors, or knife, cutting half way through them, the flow of blood being controlled by an assistant lifting gently on the catgut strand. A gauze sponge, moistened with salt solution, is placed over the recipient's wound, until the blood is transferred from the donor. The sterilized tubes, coated with the aid of an alcohol lamp, or Bunsen burner, with the paraffin mixture in aseptic hands, is inserted in the donor's vein pointed away from the heart. His blood pressure, aided by flexing and extending the fingers, fills the tube with blood. If difficulty is experienced in inserting the tube, small right-angled forceps or little hooks make useful vein openers. If the blood does not flow readily, altering the position of the tip of the tube facilitates the flow, for the tip may be pushed against a valve in the vein, or against the vein wall too tightly.

When the desired amount of blood is in the tube, it is removed from the vein, and the assistant lifts the catgut gently, stopping further flow. Care should be taken to prevent loss of blood from the tube, by holding one finger over the cork stopper, which falls out readily if the tube is tilted to one side, and placing another finger over the right-angled branch of the tube, during transfer to the recipient. The tube is inserted in the vein toward the heart, and a sterilized cautery bulb is used to drive the blood in slowly by air pressure. Air embolism is to be avoided, by removing the tube from the vein before all the blood has been driven out. The veins are tied off doubly, and excised between ligatures, and the skin sutured.

This transfusion brought the patient's pulse down to 100, improved its quality, and gave a pink color to his cheeks.

A tourniquet was then applied to the right upper leg, and a mid-thigh amputation, by transfixion, was quickly done under primary ether. The flaps were not sutured, the blood vessels were tied, and chlorinated soda dressing applied. One pint of salt solution was given subpectorally.

The patient withstood the shock of the operation very well, and had no more hemorrhages.

Three days after operation, he developed a virulent streptococcus septicemia, as shown by blood culture. He was given one hundred cubic centimeters of one-half per cent. Eusol solution, intravenously, without effect one way or another. He ran a septic temperature, and died suddenly on the fifth day after operation. No autopsy.

The donor of this transfusion was chosen particularly, because he had a healing granulating wound of the back, caused by shrapnel, and it was thought that his blood would contain antibodies favorable for the recipient.

The following case is a typical one of secondary hemorrhage. I demonstrated this method of blood transfusion at Canadian Number One General Hospital, on the invitation of their surgeons.

The patient, Lance Corporal W. E. S., 1288, of the Tenth Royal Fusiliers, age thirty-three, was admitted to that hospital two days previously, with amputation of the right lower leg, for gas bacillus gangrene, and gunshot wounds of the left hip and knee. He had previously had several severe hemorrhages from his wounds, and he was very anemic. Two hundred and fifty cubic centimeters of blood were transfused from Private L. J. S., 21299, of the Eighth Border Rifles. The recipient had two septic wounds of each elbow, involving the median basilic and median cephalic veins, due to salt solution being injected intravenously at the front, so we had to use the cephalic vein high up in the upper arm.

The patient's general condition was improved, and he had no more hemorrhages. Three weeks later, I saw both donor and recipient, and both were doing well. The donor in this case was admitted for bronchitis.

The blood of a member of the patient's family is preferable to a stranger's blood, but hemolysis may occur when two children of the same parents are transfused, so one need not hesitate about using a healthy stranger's blood, in small, and if necessary, repeated doses.

Hemolysis is rare, and even if it does occur, a small amount of blood, as half a pint, is not overwhelming. If no hemolysis occurs, that amount of blood may, and usually does, stop further bleeding, and under favorable conditions the dose may be repeated, if indicated.

The transfusion of blood not only tends to stop hemorrhage, but at the same time furnishes a highly concentrated form of nourishment, and in my opinion should be employed more frequently.

UNDESCENDED TESTICLE IN CHILDREN.*

By C. G. Mixter, M.D., Boston.

The testicle normally descends into the scrotum during the eighth month of intrauterine life. As it passes from the abdomen down the inguinal canal to the scrotum, it lies in a process of peritoneum, the processus vaginalis that becomes obliterated by fusion of its surfaces, leaving a closed sac at the lower end in which the testis lies, the tunica vaginalis. If, however, the testicle fails to descend, fusion does not take place. The undescended testicle, therefore, is accompanied by a congenital hernia. Though merely a matter of degree, the undescended testicle can be described for convenience as lying intra-abdominally, within the inguinal canal or at the external inguinal ring. The scrotum is always shrunken and rudimentary.

In performing any plastic for the relief of this condition, the essential factor is to obtain a sufficient length of cord to permit the testicle to rest easily in the scrotum without tension. It is much easier to secure sufficient length of the vas than of the spermatic vessels. For this reason complete section of the spermatic vessels has been advised by Bevan in cases where the testicle cannot be brought readily down into the scrotum. The accompanying vessels of the vas he considers will suffice to nourish the testicle.

In the past 3 years, 30 operations have been performed for the relief of this malformation at the Children's Hospital. In 7 cases the condition was bilateral; in 9, the right, and in 7, the left side was affected. In 3 cases the testis was intra-abdominal. In 19, it lay within the inguinal canal, and in 8 cases it was just outside the external inguinal ring. In 2 cases, atrophy was noticed at the time of operation. In 1, the testicle was enlarged and thought to be tubercular, and there was an accompanying tubercular peritonitis. The age at operation was: under 2 years, one case 20 months old; between 2 and 6 years, ten cases; between 6 and 12 years, 12 cases.

The late result of operation was ascertained in 26 instances—4 cases failed to report. The two cases in which atrophy was noted at operation, showed no improvement in the development of the testicle, although the organ remained in the scrotum. There was atrophy in 8 cases following operation. Interference with the enervation of the testicle has been suggested as a cause of atrophy following operation, but nothing to substantiate this view could be deduced from the operative records of these cases. The age at operation had no bearing on the occurrence of atrophy, it being no more frequent in the younger group than in the older in this series. The one factor present in every instance where atrophy occurred, was an interference with the spermatic circulation at operation.

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* Read at a meeting of the New England Branch of the American Urological Association held on Nov. 30, 1915.

These cases can be divided into 3 groups; in one, all the spermatic vessels were cut at operation to facilitate the placing of the testicle in the scrotum. In the second, a portion of the lesser vessels were divided and the 3 or 4 main trunks were left. In the third, the vessels were left intact—the latter group comprises 15 operations. Of 14 cases reporting there was no occurence of atrophy following operation. There were 5 instances of partial division of the vessels. One case did not report and in one case there was post-operative atrophy. The vessels were completely divided in 9 cases; 7 cases reported and in every instance there was marked atrophy. In all the testicle was soft and no larger than a bean. At one operation the testicle could not be brought down and was replaced within the abdomen.

There were 4 cases of bilateral undescended testicle in which section or partial section of the vessels had been performed on one side and the vessels left intact on the other side. Three reported and in every case the testis was atrophied on the side where the vessels were cut; while where the vessels were left intact, the testicle developed normally. In the fourth case the time since operation has been too short to make the observation of value.

At the risk of repeating what is already familiar to you, with perhaps the exception of certain minor points of technic, I will briefly outline the steps of the operation I have found will best conserve the spermatic vessels and give adequate length to the cord.

A liberal hernia incision is made and the external oblique aponeurosis is split. The hernia sac is separated from the cord and a tunica formed about the testicle from its lower end. The testicle should not be handled unless covered by its tunica. Trauma of the unprotected testicle is the usual cause of the excessive swelling that sometimes follows this operation. A bed is prepared in the scrotum. The hernia sac is transfixed and tied at the internal ring and excised. Traction is made by the tie on the peritoneal stump and by blunt dissection, the peritoneum covering the vessels as they pass upward and backward is freed along the posterior abdominal wall. Preferably this is done by finger dissection. By gentle pull on the testicle, the fibrous bands holding the vessels are brought into view and torn across. The separation is carried on as far as the finger can reach. All of the cremaster muscle and fibrous tissue is excised, leaving simply 4 or 5 spermatic trunks in the inguinal canal free from the vas. The latter is similarly freed from peritoneum where it turns downward and backward into the pelvis, and the transversalis fascia, whose upper margin forms a pulley over which the vas hooks, is incised downward as far as the deep epigastric artery. This will unquestionably lengthen the vas sufficiently. Should the vessels still prevent the testicle from lying without tension in the scrotum, gentle traction on the testicle will show which of these trunks are under the greatest strain and one or two of these may be tied and cut. A temporary suture is then placed through the tunica and passed out through the bottom of the scrotum and clamped to the operating sheet to hold the testis in position during closure. Purse string sutures around the upper part of the scrotum are unnecessary. The hernia is repaired without transplantation of the cord.

During the last 3 years, I have followed this procedure in 23 operations. The testicle was brought down into the scrotum without sacrificing the spermatic vessels in 17 instances. One case has not reported, in one atrophy was noted at operation and still persists, and two operations have been done within the last month and should not be enumerated. In the remaining 13 cases there has been no atrophy and the testicle was found movable and in the scrotum at examination. In 4 instances partial resection of the vessels was done. Atrophy was found at operation in one; the condition is unchanged. Atrophy followed operation in one case. In the other two instances there has been no atrophy; the testicle having been intra-abdominal in one of these. In two cases the spermatic vessels were completely divided. I do not now consider that the procedure was essential or justifiable in these cases. Both show marked atrophy.

The results obtained in the younger children in this series were as good as in the older children, both in regard to the position of the testis in the scrotum and in the presence or absence of atrophy.

Preferably operation may be performed at any time after 3 years. Should beginning atrophy from pressure be noted, however, early operation should be advised. If the hernia gives rise to symptoms a plastic can be done in infancy and a good result may be expected.

I have considered the results in these cases satisfactory as long as there was no atrophy and the testicle remained in the scrotum, without attempting to differentiate between the instances where the organ lay in the lower or upper quadrant of the scrotum, as in either position it was not exposed to trauma or subject to pressure. In no case has there been a recurrence of the hernia.

The testicle in childhood requires a free circulation for normal development. A plastic operation by which the undescended testicle is placed in the scrotum without impairment to the circulation will be followed by normal growth. Where partial resection of the spermatic vessels is necessary, atrophy may or may not ensue. Complete section of the spermatic vessels has been invariably followed by atrophy in this series of cases, the blood supply from the artery of the vas being insufficient to nourish the developing testicle. This operation should be resorted to in children only under exceptional circumstances.

THE MECHANISM OF THE PROTECTION AFFORDED BY THE DRAINAGE OF PROSTATICS AS A PRELIMINARY TO OPERATION.*

A Consideration of the Production of Immunity.

By Hugh Cabot, M.D., Boston,

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and

E. Granville Crabtree, M.D.,

Assistant Genito-Urinary Surgeon to Out-Patient Department, Massachusetts General Hospital.

No discussion is necessary to establish the now generally accepted view that the custom of preliminary drainage before operations for prostatic obstruction has been an important factor in reducing the mortality. Much obscurity, however, surrounds the reasons for the benefit thus produced and it is with this subject that we are here concerned. The importance of preliminary drainage is by no means equal in the various classes of cases presenting themselves for operation. It will probably be generally admitted that preliminary treatment, of which drainage is the most important constituent, is most essential in the class which comes to us with the largely over-distended bladder, sometimes stretched to the point of overflow, but in whom infection has not yet occurred. We all of us remember the dreadful mortality which accompanied the attempt to empty the bladder and remove the obstruction immediately upon coming under observation. It is notorious that these cases did badly from the start and died generally with the symptom-complex which we somewhat loosely call uremia. Perhaps the next most lethal proceeding was to operate at once upon those cases with a moderate residual of from 6 to 12 ounces and a still uninfected urine, while immediate operation was least hazardous in those cases with a moderate residual thoroughly infected and best typified by the patients who had for some time been leading the so-called catheter life. The extremes are represented by the over-distended uninfected bladder and the thoroughly infected but regularly emptied bladder enjoying a catheter life.

We shall perhaps approach the question in the most orderly fashion if we inquire what benefits are produced by the preliminary drainage which we now institute, and why these benefits accrue. The effects appear to us to be the result of two factors: 1. Relief of the so-called "back pressure," with the equalization of the kidney circulation thus resulting, and 2. Infection which, though long believed to be chiefly a cystitis, is now generally regarded as in fact a pyelonephritis. This infection is not absolutely inevitable and there are doubtless a certain number of cases which, under the methods ordinarily employed, we believe to be small, in which the process of emptying the bladder and restoring the equilibrium of the kidney is carried through without infection. This is, however, certainly the exception, not the rule, and we are therefore chiefly concerned with the majority of cases in which infection of a more or less serious degree occurs. It has been our experience that infection is most difficult to avoid in the cases with over-distended, uninfected bladders and that the probability of infection is increased rather than diminished by the presence of the inlying catheter. The patients in whom it is most frequently possible to avoid infection are probably those with a moderate residual, still uninfected, whose urethrae are readily passable to instruments and who can therefore be managed by the process of intermittent catheterization.

Now it must be evident that the relief of back pressure upon the kidney and the infection of the kidney, which so commonly accompanies this process, both will affect the kidney function, and as kidney function is the most accurate measure of the margin of safety which these patients enjoy, we can most accurately estimate the effect of these conditions upon the patient's health by studying its effect upon his renal function. For the purpose of studying the changes in kidney function we have employed the phthalein test and, though recognizing its limitations, continue to regard it as on the whole the most useful measure of kidney function. Lumping together for the moment all the cases with residual urine treated by drainage, whether that residual be large or small, infected or uninfected, drainage produces, generally speaking, a drop in function, an intermediate period in which function remains more or less low, and a return frequently to a point somewhat below the original level but sometimes equalling, or even exceeding, it. (Figs. I, II and III and IV). The greatest fall in function is to be expected in the cases of recently over-distended, uninfected bladders, while the least reaction is undoubtedly seen in the cases with a moderate infected residual. The very great drops occasionally seen in patients with over-distended, uninfected bladders, we believe to be due to a composite process, part of the drop being due to the relief of pressure, with consequent acute congestion of the kidney, and another perhaps equal amount due to acute pyelonephritis. Some difficulty may be experienced in assigning the proper proportion to each of these factors, but we can arrive at an approximate estimate of it by studying the cases in which only one of these factors is operative. We have been able to study a small group of over-distended, uninfected bladders which were successfully emptied and brought to excretory equilibrium without the intercurrence of infec-

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* Read at a meeting of the New England Branch of the American Urological Association, held on Nov. 30, 1915.

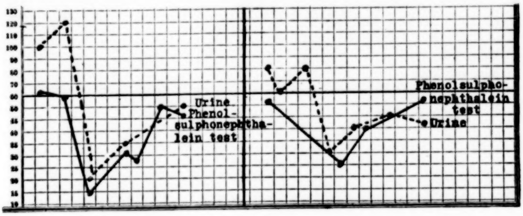

FIG. I. FIG. II.

FIGS. I. and II. copied from Pilcher, showing simultaneous drop in amount of urine excreted and the phenolsulphonephthalein test in patients on constant drainage preliminary to operation.

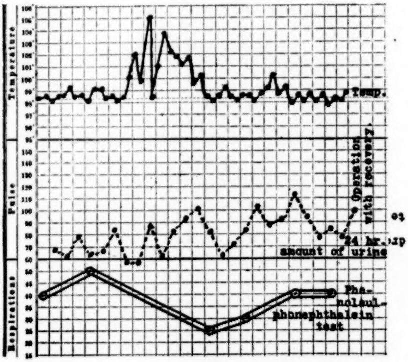

FIG. III. A man of 60. Hospital No. 199448. Diagnosis: Adenomatous prostate with uninfected residual of 14 ounces. Symptoms of pyelonephritis developed during drainage.

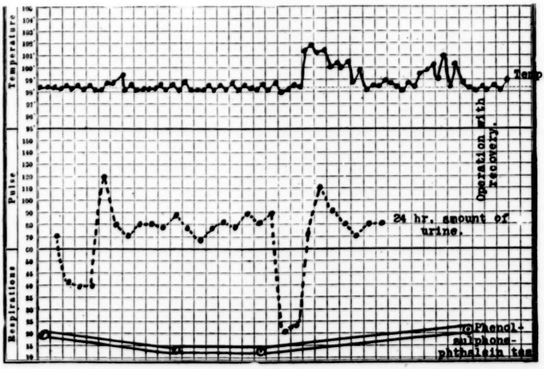

FIG. IV A man of 61. Hospital No. 199851. Diagnosis: Adenomatous prostate with long-standing residual as yet ininfected. Unvaccinated. Pyelonephritis.

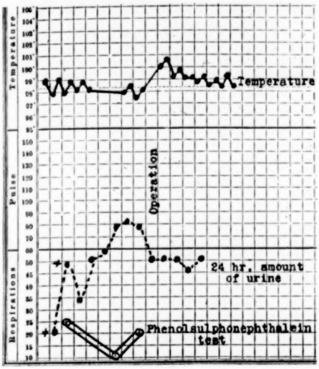

FIG. V. A man of 76. Admitted to the hospital Nov. 8, 1915. Private patient of Dr. Cabot. Diagnosis: Adenomatous prostate with uninfected residual of 18 ounces. Preliminary vaccination.

tion. Such cases are typified by the chart presented in Fig. V. In this case, a careful bacteriological study of the urine showed entire absence of infection from the start to finish. It will be noted that the fall was over 50% but that it never reached very low figures and rather promptly returned to something like the original level. With this we should compare the cases of pure pyelonephritis without organic obstruction, such as are seen in the early months of pregnancy or immediately after confinement. Fourteen such cases are charted in composite Fig. VI. As they entered the hospital with an active pyelonephritis, the low function at the first test may be taken to represent the average effect of the disease, while the rise to time of discharge represents decline of parenchymatous involvement.

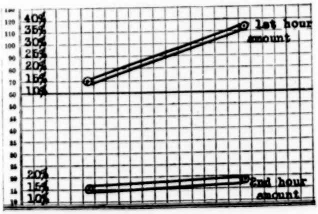

FIG. VI. A composite chart of 14 cases of pyelonephritis in women, all, save four, associated with pregnancy, showing excretion of phenolsulphonephthalein for two hour periods. The beginning of the curve represents the average output of phenolsulphonephthalein during disease. The end of the curve shows the average output at the time of the patients' discharge from the hospital.

With these two factors thus more or less definitely understood it is possible to see why the greatest drop should occur in the over-distended, uninfected (Figs. I and II) and why there may be little or none in the moderately distended infected (Fig. VII). In the former case, two factors, both tending to reduce kidney function, become operative at somewhere nearly the same time, the congested kidney with diminished function being further submerged by the intercurrence of a pyelonephritis. On the other hand, the patient with an already infected urinary tract is exposed only to the drop of function resulting from what one may call decompression. He is, we believe, protected from an intercurrent pyelonephritis by the immunity which he has established as the result of a previous infection (Fig. VII). This, we believe, accounts for the notoriously better results of emergency operations upon patients leading a catheter life.

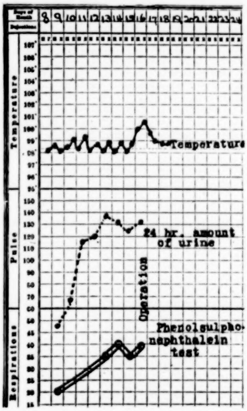

FIG. VII. A man of 66. Hospital No. 189020. Diagnosis: Adenomatous prostate with infected residual. Patient has led a catheter life.

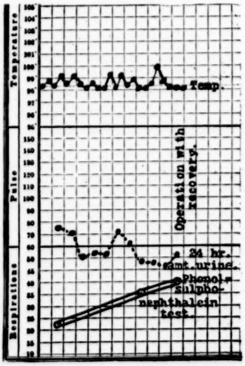

FIG. VIII. A man of 68. Hospital No. 204323. Diagnosis: Adenomatous prostate with uninfected, overdistended bladder. Bladder at umbilicus. Preliminary vaccination.

We are now in a position to estimate the causes operating through the kidney to produce the high mortality before the days of preliminary drainage. In the worse cases (the over-distended, uninfected) these patients were asked to survive three more or less lethal assaults all of them operating to depress kidney function and attacking them at substantially the same time, namely, decompression congestion, operation and pyelonephritis, with no previously established immunity. Drainage has had the effect of separating these three factors in point of time so that the decompression comes first, the pyelonephritis comes second and these two being survived, the operation comes third. This not only has the eminently desirable result of enabling a considerably larger number of patients to survive but the also not undesirable corollary that should the patient fail to survive the first two catastrophes, he is not added to the burden of the statistic-worshipping surgeon.

Now there is one of these three factors to which less attention has been paid than we believe it deserves, namely, the intercurrent pyelonephritis. The decompression congestion can hardly be avoided, at least to some degree, the details of the operation have commanded the attention of the most eminent, but the important kidney infection has been too much regarded as an unavoidable catastrophe. During the past year we have concerned ourselves extensively with the nature of pyelonephritis and its effect on function. The process which we here term pyelonephritis is that commonly referred to in medical literature as pyelitis. This we believe to be a misnomer, though the pathological material for the formation of an opinion is by no means plentiful, since the disease is not commonly fatal. The term pyelitis has been loosely applied to a group of cases whose chief symptoms are bladder irritation, pus in the urine, fever and varying degrees of costovertebral tenderness. This picture is practically always produced by infections with the colon bacillus, though it may possibly be produced by other organisms. From evidence already presented by one of us (E. G. C.) we believe it to be relatively clear that this is an excretory type of infection, by which we mean that the lesion occurs in the attempt by the kidney to get rid of colon bacilli circulating in the blood. Under reasonably normal conditions this feat is generally successfully performed and the kidney suffers no damage. Under conditions attended by renal congestion successful excretion often fails and kidney infection occurs. We base our opinion that this condition should be regarded as a pyelonephritis and not a pyelitis, largely upon the evidence of the marked depression of kidney function which accompanies it. We see no reason to believe that infection of the renal pelvis alone can produce any such effect on function as is here observed and there is a moderate amount of pathological evidence to show that the lesion is not simply one of the pelvis. A case under our observation bears directly upon this question. The patient was a "prostatic" with a typical intercurrent kidney infection in which the colon bacillus was reclaimed first from the blood and later from the urine, and who died shortly after operation of hemorrhage and streptococcus septicemia. The kidneys showed a very moderate lesion of the type known as cloudy swelling, most marked in the convoluted tubules, with a still early but microscopically well marked pyelitis. In this patient a previously good renal function was depressed 20 points by the kidney infection, which, nevertheless, left but very moderate evidence of damage. To this might be added several other less fully studied cases whose clinical course entitles us to believe that they had similar lesions.

The striking fact about these cases of pyelonephritis is the amount of the effect on the kidney function as compared with the apparent lesion. In fact they are likely to be passed by the pathologist as substantially normal unless a careful study be made of the tubular area. This discrepancy may be explained by the fact that the phthalein excretion is perhaps carried on chiefly by the convoluted tubules and that a comparatively mild lesion of this area will have relatively striking functional effects. We desire also to draw attention to the fact that the permanent lesion, where such occurs, is chiefly in the renal pelvis where, in persistent cases, a chronic catarrhal pyelitis remains, giving rise to the persistent bacilluria and being the source from which recurrent invasions of the kidney, chiefly in its interstitial portions, occur.

The next important question which we are required to discuss is the mode of entrance of the bacilli into the circulation, having regard only to this particular group of cases. As tending to show that these infections are of hematogenous origin we submit the evidence already reported by one of us (E. G. C.) that blood cultures in these patients with prostatic obstruction on constant drainage are positive for the colon bacillus in a proportion of cases about equal to that occurring in typhoid fever, in which the infection is admitted to be of hematogenous origin. It is further to be noted that positive cultures are much more likely to be obtained when the blood is taken at the onset of the attack and that cultures taken at a subsequent period are more likely to be negative. In these cases it is obvious that the organism is most likely to enter the blood from some portion of the lower urinary tract and that of these structures the prostate is the most probable offender. Examination of the prostates removed from patients who have been on constant drainage shows clear evidence of an acute prostatitis and the large blood supply of this organ is such as to render absorption probable. Moreover, clinically, irritability of the prostate is not infrequently observed at the time of onset of the kidney infection, which at least suggests that it bears a causal relation. Obviously both the bladder and the urethra may undeniably be sources of supply; the bladder, because it has been decompressed, is congested, frequently infected and not infrequently injured, while the urethra is almost invariably the site of a traumatic urethritis. Which one of these three possibilities is operative in any given case may be difficult to decide.

This briefly expresses our view of the nature of the pyelonephritis which, as we have already pointed out, is the most important avoidable incident of the preliminary drainage in cases of prostatic obstruction. We believe it to be relatively clear that the effect upon the kidney of the decompression is rarely in and of itself a factor of first class importance. The infection appears to us to be the most weighty consideration and we have come to believe that the chief benefit resulting from preliminary drainage in these cases is the immunity to pyelonephritis as a complication of the operation, which immunity is conveyed by the pyelonephritis resulting from drainage. In a word, the chief benefit of drainage to the patient is infection, not because the infection is desirable but because the immunity which therefrom results gives him a security which it has not been possible to obtain in any other way. That this immunity is of short duration seems probable from the fact that patients with a chronic pyelonephritis notably suffer from relapses of the nephritis element at longer or shorter intervals.

If now it is believed that our contention on this point is of substantial soundness the foundation has been laid for the understanding of our further proposition, namely, that it may be possible to produce immunity to pyelonephritis in these patients by a method less violent than the actual production of the disease. It has been amply demonstrated that a considerable degree of immunity to the typhoid bacillus can be produced by what is known as vaccination. The relation between the typhoid and the colon bacillus is one of reasonable kinship and it is therefore at least arguable that they may behave in a somewhat similar fashion. That the problem is far more complicated when dealing with the colon bacillus must be admitted at the outset, since the family of colon is a numerous tribe. On the other hand, it has already been shown that immunity to certain strains of the colon bacillus can be produced both in man and in animals. Our own work upon this subject has been carried on only for a period of six months, but we have been able to satisfy ourselves that in so far as agglutination can be regarded as a measure of immunity we have been able to produce it in our patients. We have worked with single strains, and with a variety of strains combined, and our clinical results to date, though too meagre to be made the basis of dogmatic assertion, appear to have been attended by some measure of success (Fig. VIII). At the outset we confined our efforts to those cases which came to us uninfected and have attempted in them to produce a protective immunity. More recently we have extended this work to cover the cases already infected, in the attempt still further to raise their immunity to the intercurrent infections which bladder drainage is so likely to invite.

We wish to be clearly understood as presenting this only as the beginning of a piece of work which appears to us based upon sound premises and draw attention to it this time in order that the efforts of others may supplement our own endeavor, should it seem worthy of further consideration. That intercurrent pyelonephritis is for the prostatic a serious catastrophe seems to us clear; that it is in some ways a protective mechanism is at least a reasonable contention. If this protection can be established by the production of artificial immunity, a considerable advance will have been made toward eliminating an important factor in the mortality of operative procedures for the relief of prostatic obstruction.

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Clinical Department.

PREGNANCY COMPLICATED WITH HERNIA.

By John P. Gardiner, M.D., Toledo, Ohio.

Statistics show that the percentage of hernia occurring during gestation is very low. M'lle Komarowsky[1] in her thesis reporting the work of Braun at the Maternity of Vienna, covering a period of 26 years and the examination of 75,659 pregnant women, found only 62 women with hernia, or 0.08%. Miller, in 9,482 pregnant women, found 35, or 0.04%. Alphi at St. Gall in 1,555 cases reports 0.6%. Hurbert of Louvain found 1%.

The number of women, whether pregnant or non-pregnant, having hernia, is considerably less than the number of men. The first statistics bearing on this comparison were reported by Mounikhoff in 1836, who showed that women having hernia were about 1 to 4 as many as men. The same proportion was found by Berger[2] in his personal examination of 10,000 cases of hernia, who found the statistics to be: men 6,220, women 2,229, boys 1,213, girls (under 15 years) 305, making 7,433 for the masculine and 2,534 for the feminine sex, a preponderance of a little less than 75% of men over women.

Malgaigne[3] at the Central Bureau in Paris, in 1836, on 2,767 hernia cases, found 2,203 men and 564 women. In 1837, on 2,373 hernia cases, he found 2,884 men and 489 women, about 1 to 4 being the proportion. Jonathan Macready,[4] in his table of statistics for 1888 to 1890, furnished by the Truss Society, London, reported that he found the proportion 1 to 5 for women compared to men.

The frequency of hernia in women increases from puberty to the climacteric,[5] while in men it remains the same. Hernias which do develop during pregnancy, particularly inguinal or femoral, frequently reduce themselves (Berger, Freund, Schauta). This procedure can be explained as a simple mechanical process. The gravid uterus, in its ascent from the small pelvis, pushes up the intestines and the uterus fills up the gap, unless the gut is adherent. However, after labor the ring is apt to become enlarged and the hernia grows worse during the puerperium, because of the relaxed condition of the supporting muscles. All authors agree as to the frequency with which women, questioned as to the beginning of their trouble, date the beginning of their hernia from pregnancy. The multiplicity of pregnancies very greatly increases the tendency to develop hernias, as was shown by Berger,[2] who interviewed 2,229 women of all ages having hernia and found that 1,871 had had pregnancies to term.

Umbilical hernias, unlike inguinal or femoral, hernias, occur mostly in the first year of life and become more and more rare until at 25 years of age they practically disappear. After this age they increase in frequency. Umbilical hernias are more common to women[2] than to men. When umbilical hernias develop during pregnancy their presence is apt to make severe complications. Of 41 cases seen by de Rycker[6] 10 were irreducible. The danger of strangulation increases as pregnancy progresses, de Rycker's analysis shows no case of strangulation in the first 3 months, 2 in the 4th, and one each in the 5th, 6th, 7th, 8th, and 4 in the 9th month. Pantaloni[7] recommends interference with all umbilical hernias during the first month as the risk of operation is less. The operative mortality of strangulated umbilical hernia is well over 50% (Coley[8], Manley[9]).

Other hernias, more rarely met with than inguinal, femoral or umbilical, are few in infancy and adolescence and increase in frequency up to 35 and 40 years. Pre- and retro-vaginal hernias are due to pregnancy[2], pre-vaginal or pudendal being the more common. These are to be reduced if possible, if not, pregnancy should be terminated[7]. Vagino-labial hernia[2] occurs in the inguinal locality. A hernia may contain an impregnated uterus[10]. Hernia of the white line or ventral is virtually in the same class as umbilical hernia.

Of all hernias the inguinal is the most common kind. Macready[4] found inguinal 50.4, femoral 31.6; Berger, inguinal 46.6, femoral 32.7. It was found that the proportion was the same for pregnant women. Komarowsky[1] in 35 cases, 22 inguinal, 4 femoral, 9 diverse. Either side, right or left, is about equally affected.

Inguinal and femoral hernias, occurring during pregnancy, frequently reduce themselves mechanically as has been mentioned above. Yet, if they do persist and cause pain or distress radical measures should be resorted to. The literature on herniotomy during pregnancy is small; nearly all references are to single case instances. The largest group studied is from Engstrom's Clinic,[11] which comprises 18 cases upon which herniotomy was performed: umbilical 9, inguinal 8, femoral 1. They all healed per primam intentionem. Of the umbilical 2 recurred, one 4½ years after 2 normal pregnancies, and the other, during the next pregnancy.

Fischer,[12] in 1898, employed the Schleich method of anesthesia with success. Cushing, Bloodgood and Bodine, in 1900 used cocaine to good effect in herniotomies. With the advent of novocain combined with adrenalin the necessity of giving a pregnant woman a general anesthetic for herniotomy is done away with.

Of the three cases of hernia which the writer has had occurring during pregnancy and demanding an operation, one was inguinal and two were umbilical.

Mrs. M., aet. 26, Para II, birth of first child was 2 years ago, pregnancy normal and puerperium uneventful. She became pregnant March, 1915. July 5, while coming down stairs carrying her baby, her heel caught on the stairs. With great difficulty she recovered her balance and the effort was accompanied by a sharp stinging pain in the left groin. The pain passed away in the course of a few hours, but she noticed that whenever she was on her feet a long time, an aching pain was felt in the left groin. Early in September, an enlargement, the size of a hazel nut, was noticed and by October it had increased in size and troubled her so that she was practically incapacitated. October 15, under local anesthesia, herniotomy was performed. Recovery was uneventful. December 18, 1915, she was delivered of an 8½ lb. girl. Puerperium normal and has remained well. The cicatrix is firm.

Mrs. K., aet. 36. Para VI, had been pregnant 2 months when she began to notice a peculiar pain about the umbilicus when she lifted heavy objects. Examination revealed an umbilical hernia. In the 3d month an overlapping operation was done under local anesthesia. Recovery uneventful. Pregnancy continued normal, and she gave birth to a 6 lb. girl; puerperium was normal. The cicatrix remains firm.

Mrs. B., aet. 32, Para IV. Since the last child, has noticed a little painful swelling just at the right quadrant of the navel. It hurt her to cough or sneeze. She became pregnant October, 1911. On November 21, she underwent the overlapping operation. Recovery uneventful. Pregnancy pursued its normal course and the patient was delivered of a 9 lb. boy, July 19, 1912. Puerperium normal, no recurrence to date and she has passed through another pregnancy.

It is evident that pregnancy is one of the chief contributing factors in the production of hernia in women. From this study the writer coincides with the admonition of Berger that every accoucheur should examine for the patency of the hernial orifices, before the recently delivered woman is discharged.

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Medical Progress.

PROGRESS IN BIOCHEMISTRY.

By A. Everett Austin, M.D., Boston.

VARIATION OF THE BLOOD SUGAR CONTENT.

Many improvements have been made in the methods of blood sugar determination, all of which tend to greater simplicity and are better adapted to the use of the clinic and the employment of smaller quantities of blood. Other investigations have also shown that the amount of sugar in the blood has much greater significance than its presence or its amount in the urine, as being much more closely associated with the sugar building and sugar destroying functions of the body.

Maase and Tachau[1] have performed a number of sugar estimations, employing both the polarization and reduction methods, and have shown a remarkable similarity, with the exception of one case, in the results by both methods. In this instance the amount determined by polarization power was much greater than that of reduction, apparently due to the presence of another carbohydrate in the blood whose polarization power was much greater than that of dextrose but whose reduction was much less. After the ingestion of 100 grams of fruit sugar the reduction values were much greater than the polarization and the greatest difference occurred in a case of icterus.

The estimated glucose content of the blood after the ingestion of 100 grams of levulose was repeatedly greater than the normal limit in the fasting individual.

According to Lauritzen[2], the estimation of blood sugar acquires great clinical importance in the differentiation of diabetes with hyperglycaemia and diabetes without it; secondly in the determination of the prognosis of those cases where the presence of acetone and diacetic acid in the urine offers us no light concerning the increasing severity of the disease, and last to control the results of our therapeutic efforts during which repeated determinations of the blood sugar should be made.

While previously we were compelled to depend upon the sugar-free condition of the patient's urine for the results of our dietetic management, we can now determine the foods which produce no hyperglycaemia after their ingestion, when these foods only must be taken by the patient as long as possible.

The avoidance of hyperglycaemia is not only of greatest importance in diabetes, with complications such as neuralgia, gangrene, eczemas and tuberculosis, but also in the uncomplicated mild and severe forms of the disease. It has been distinctly determined by him that hyperglycaemia, though temporary, injures the tolerance of the patient for carbohydrate when suffering from diabetes.

Dresel[3] has investigated the influence of extracts of glands with internal secretion on the blood sugar. The following preparations were employed by him: Extract of the anterior hypophysis, of the parathyroid, of the ovum, of the pancreas, of the intestinal mucous membrane and of the placenta. The injection of 1 cc. of these extracts causes no effect upon the amount of blood sugar; on the contrary, when injected in conjunction with 1-10 mgm. of adrenalin, which alone was able to increase the blood sugar sixteen hundredths of one per cent., the customary increase due to adrenalin was much diminished. This is particularly true of extracts of the ovum, the pancreas and the parathyroid glands. The influence of all these substances was vastly greater than that of the pituitary gland. The other extracts mentioned do not influence in any way the sugar exciting power; apparently, these substances act directly upon the central nervous system.

Brockmeyer[4] publishes a case of Addison's disease, in which the sugar content of the blood remained normal and showed that the severity of the disease bears no relation to the symptom of hyperglycaemia.

CHOLESTERIN METABOLISM.

By experiments on dogs with biliary fistulae, Fasiani[5] has shown that the ingestion of food after a period of fasting produces an increase in the cholesterin of the blood and of the bile. This increase is much greater after the employment of foods rich in protein and fats than after carbohydrates. An increase or diminution of the cholesterin content of the bile is always associated with a corresponding increase or diminution of cholesterin in the blood, but in the reverse direction. When phlorizin is injected, a steadily increasing amount of blood cholesterin is associated with a corresponding decrease of bile cholesterin. In conclusion, the author considers that there is a close relation between the cholesterin content of the blood and the bile, and that the liver is intrusted with this regulation.

Henes, Jr.,[6] has made numerous estimations of the amount of cholesterin in the blood in various forms of disease and has come to the following conclusions: Practically all gallstones consist for the most part of cholesterin and the increase in blood cholesterin appears to be the cause of the gallstone formation. When gallstones exist without fever, there is almost always a marked increase of cholesterin in the blood which can be employed for the purpose of differential diagnosis. This increase of cholesterin in the bile is liable to persist even after the removal of the stones, while a cholecystotomy, without removal of the gall-bladder, does not free the patient from the possibility of subsequent formation of stones.

Rothschild[7] has shown by experiments on rabbits that the removal of one suprarenal gland is accompanied by a moderately increased amount of cholesterin in the blood. When both suprarenals are removed a much more rapid and distinct increase of this substance in the blood is noted than by the unilateral operation. Corresponding with the double removal there is an increase of excretion of cholesterin in the bile. The distinction between the effects produced by the loss of one or both suprarenals is not great enough to regard this operation on the kidney as a producer of cholesterin and their significance, then, depends not upon their control of cholesterin metabolism, but upon their content, apparently as a storehouse.

PROTEIN METABOLISM.

Protein still continues to be a puzzle as to its disintegration in the digestive tract and its regeneration in the blood. That the different proteins act variously in accordance with their percentages of the various amino-acids is becoming better known, and that some of them are not efficient foodstuffs because they are so utterly unbalanced in these before-mentioned acids, which apparently form the foundation stones of the regenerated albumin molecule. Considerable work has been done by various investigators during the year.

Boruttau[8] has found, by feeding without protein from the vegetable foods, that the chemically proven lesser value of the grain proteins in comparison with that of animal character does not actually exist, if the grain is ground as a whole, since those portions comprising the envelope of the grain contain the missing fraction and are able, when employed with the bolted flour, to replace those amino-acids which are lacking and which make the plant protein fully equal to the animal.

Abderhalden[9] and his associates have shown that much less protein is needed to maintain the nitrogen equilibrium of individuals when potatoes are employed, and this same fact is true apparently of Swedish bread. During a period of ingestion of potatoes, an amount containing 4.5 grams nitrogen was sufficient to maintain the protein equilibrium of the body. When we withdraw from this the amount of nitrogen appearing in the feces we find that upon an exclusive potato diet a nitrogen minimum of four grams is sufficient to maintain the protein equilibrium.

Zeller[10] has investigated the influence of fat and carbohydrate in the presence of deficient protein upon the nitrogen elimination. Seventy to ninety per cent. of the carbohydrate can be replaced by a caloric equivalent of fat without the nitrogen elimination exceeding the minimum with a pure carbohydrate regimen. For complete oxidation of the fat, the food must contain at least one part carbohydrate to four parts of fat; the urea may be diminished so that it forms only forty per cent. of the total nitrogen. The excretion of creatin and creatinin remains the same whether we employ a carbohydrate or a fat diet. The elimination of neutral sulphur is practically the same and, only when we employ a fat caloric value of ninety per cent. of the total, is increased. The amino-acid and peptid nitrogen behave exactly as the neutral sulphur. The uric acid and purin excretion sinks during the early part of the pure fat period but later with the addition of sugar exceeds the amount determined during the pure sugar period. The increased nitrogen elimination which occurs during the fat period appears to be due to the increased destruction of animal protein.

Cahn-Bronner[11] has shown that by feeding various split products of protein, such, for instance, as that portion of Witte's peptone which is insoluble in water, or the peptone obtained from meat and also its alcohol soluble portion, we may produce an accumulation of albumin in the liver; there are, however, certain factors which may prevent the accumulation of protein in the liver cells even when all the essentials for synthesis are present. No evidence was discovered which tended to show that it made any difference to the liver cells which of the split protein products were fed. In no instance ~~was the~~ parenteral introduction of protein products able to produce an accumulation of protein in the liver. These experiments show clearly that the animal organism is able, by synthesis, to produce protein from the amino-acids.

Grafe[12] has investigated the retention of body protein through the ingestion of ammonium salts and urea in man. In all his five individuals, the addition of ammonium chloride, ammonium citrate, urea or their combinations to a standard protein diet always produced an improvement in the nitrogen balance. Often a distinct minus balance was changed into a corresponding plus one. In all cases a large part of the nitrogen which was retained on the first day was eliminated on the following days with similar additions of nitrogen as during the period of standard diet. In four cases, however, a large amount of the nitrogen was not eliminated but apparently permanently retained. Futhermore, the nitrogen minimum could in this way be much farther depressed. These instances with the human correspond closely with those of animals, so that they may be applied to all warm-blooded animals.

FAT ABSORPTION AND METABOLISM.

Nakashima[13] has investigated the absorption of fat in the colon and rectum. While, after the ingestion of moderate amounts of fat or cream, fat particles appear abundantly in the blood, when examined with the dark field of the microscope, thus proving its absorption, such appearances fail utterly when fat is introduced solely by rectum. When larger amounts of emulsified fat (milk or cream) are introduced into the colon, occasionally they appear, since there is a slight absorption of fat into the blood from the colon. These, however, fail utterly, when before their introduction, the ileum is ligated or cut, just above the ileo-cecal valve. Hence it appears that with rectal enemata of fat, no such absorption appears in the blood as when milk is taken by the mouth. Whether the fat may not be taken up in a dissolved form from the rectum into the blood cannot be determined by means of examination of the blood; furthermore, by physiological examination of the colon after a rectal ingestion of fat, no such appearances of fat absorption appear, as are shown in the active mucous membrane of the small intestine.

The same author has continued his investigations on the absorption of fat from the peritoneal cavity. This occurs in cold blooded animals much more promptly than in warm blooded, while casein is absorbed from the peritoneum much more rapidly than fat. Both fat and casein appear in mice within twenty minutes in the blood and can be detected for almost twenty-four hours. In frogs both substances appear in the blood within ten to fifteen minutes and remain for forty-eight hours. The absorption of suspended lecithin from the peritoneum takes place much more slowly and continues a much longer time while the fragments disappear only after a long period. The fat-absorbing power of the pleural cavity is much less than that of the peritoneum. When the peritoneum is inflamed by chemical substances, the absorption in frogs is almost normal but in mice is fully checked. This absorption of fat and casein from the peritoneum is brought about by the lymphatics without the participation directly of the blood vessels.

According to Helly[14], the quantitative fat content of the liver and the visible appearances of fat are practically coincident, though there are instances in which these two factors differ. The quantitative amount of fat in the liver shows, between the minimum and maximum, no regular increase or diminution, but certain percentages are much more often favored. Hence, according to the author, the fatty degeneration of the liver is not so much a pathological process as a normal function regulated by pathological conditions of other organs in which an associated activity of the central regulating power may take part.

INTERNAL SECRETIONS.

Since the discovery of secretin, efforts have been made to discover the relation between the external and internal secretion of the pancreas. After the introduction of secretin, the pancreas produces an amount of pancreatic juice which exceeds fourfold its ordinary amount.

Loeb and Stadler[15] have investigated the possibility of a stimulation of both secretions by certain substances, to determine whether they are associated with each other or entirely independent. Their conclusion is that secretin produces no influence whatever upon the sugar assimilation, hence they conclude that the external and internal secretions of the pancreas are entirely independent of each other.

Fleischmann and Salecker[16] have investigated the influence of glands with an internal secretion upon purin metabolism. Nucleinic acids, when fed to dogs, were almost quantitatively eliminated in the urine; when, however pituitrin was given at the same time, the excretion of allantoin was not only lessened but also was much delayed. When, on the contrary, pituitrin was given to animals upon a purin free diet there was a slight increase of the allantoin excretion with a following diminution, although when the animal was allowed to go without any food whatever, this allantoin increase did not occur. Adrenalin, when injected in moderate doses, caused a distinct increase in the allantoin excretion without an increase in the total nitrogen eliminated. When the animals were deprived of the thyroid, the nucleinic acids which were given, were excreted in much lessened amounts. Jodothyrin ingestion causes a diminution of the allantoin excretion in conjunction with a marked protein destruction. When the animals were fasting, the ingested purin bases were eliminated in distinctly less quantities, which was interpreted as a retention. Ingestion of excessive amounts of fluid always caused a marked increase in the allantoin elimination.

The elimination of creatin and creatinin in diabetics and nephritics has been carefully studied by Lampert[17], who found that when a meat and bouillon free diet was given to healthy individuals, the creatinin excretion varied from 0.9 to 2.4 grams per day; creatin was generally not found at all or found in the merest traces (0.02 mgm.). In diabetics the values for creatinin were generally diminished or at least were found at the lowest point of normal values. Creatinin values remain in all cases, with few exceptions, under one gram, though there were very severe cases in which values were often found varying from 1 to1.2 grams. In severe forms of diabetes, with excessive acetonuria, creatin was always found in the urine, and in all instances far beyond the normal amount of 0.2 grams; in two instances, amounts of 1 to 1.2 grams were found. In mild diabetes, with only traces of acetone, creatin was either absent or was found in the merest traces. In nephritis there was also a diminution of the creatinin output even when there was excellent diuresis and when the activity of the kidney was not diminished. Creatin was found in only one case of marked renal insufficiency and then only in the merest trace. Two cases of diabetes with a coincident interstitial nephritis gave especially low values for creatinin, hence the appearance of large quantities of creatin in the urine of diabetics with acidosis is the result of a pathological metabolism and the diminution of creatinin in the urine of nephritics is the result of renal insufficiency.

NATURE OF IODINE IN THE THYROID.

For many years efforts have been made to determine the character of the iodine in the thyroid as well as the laws governing its metabolism. These researches have been continued during the past year with much enthusiasm by various investigators.

Among these, Blum and Grützner[18] found that by far the greater part of the iodine in the thyroid is firmly combined with protein. In addition, a very small fraction may be found which is soluble in acetone and is probably iodide of potash. This amount of iodide of potash was found to be independent of any ingestion of that substance and also present in such animals as had received only milk, rice or meat as food. No constancy of the thyroid iodine content was found, at least in dogs; on the contrary, when iodide of potash was ingested, there was a manifest increase in the combined iodine of the gland. This increase, then, must be due to a physiological action by which inorganic iodine is converted to organic or combined. This process is specific in the thyroid, as it occurs in no other organ of the body. When one thyroid was removed and potassium iodide was given the animal, the amount of iodine in the remaining gland was distinctly increased; when no iodine was given, the remaining gland maintained its iodine content without change, but if it were previously enlarged, the iodine content was found later increased. These findings are not to be interpreted as indicating an internal secretion of iodo-proteins on the part of the gland but intraglandular elimination of the iodine absorbed, much as the antidotal action of the liver with mercury.

The same authors distinguished very sharply between iodine metabolism and iodine secretion on the part of the thyroid.

A systematic elimination of iodine or one which continues for any length of time is never found in the organisms of warm-blooded animals except in the thyroid. The lymph glands associated with the thyroid were always found free of iodine. Other organs of normal animals which were examined contained in a few instances, but irregularly, inorganic iodine, probably derived from the food but never the combined metal. After persistent ingestion of potassium iodide, the presence of iodo-proteins was never detected apart from the thyroid. Hence the combination of iodine with protein must be a specific activity of the thyroid alone.

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Reports of Societies.

BOSTON SURGICAL SOCIETY.

(Incorporated.)

Eleventh Meeting.

A stated meeting of the Society was held on Monday, March 6, 1916, at the Tavern Club, at 8.15 P.M.

Dr. W. P. Graves read a paper on the

PRACTICAL ASPECTS OF THE INTERNAL SECRETION OF THE OVARIES.*

Discussion of Dr. Graves' paper followed:

Dr. H. T. Hutchins stated that ovarian therapy had not been reduced to any scientific basis of standardization. We can use tablets of ovarian substances or extract of corpus luteum. It is a question whether these substances are not modified by digestion when taken by mouth. The ideal way would be to introduce them into the blood stream.

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* Dr. Graves' paper was published in the August number of the *New York State Journal of Medicine.*

In regard to transplantation of ovaries, Dr. Hutchins believed that the thick capsule of the ovary probably interfered with adequate nourishment of the transplant, and that the actual output of ovarian substance after the transplantation, either of the whole or parts of ovaries, is much diminished. In hysterectomies he believed that a normal ovary should be left "in situ," if possible, even though at the risk of a second operation for cystic disease; this risk, in his experience, being very slight if the normal blood supply be not interfered with.

Dr. Malcolm Storer stated that some ten years ago he had used ovarian extract to a considerable extent, but that being unable to get a reliable preparation he had abandoned its use. The modern preparations he had found much more reliable. He believed its chief value lay in the treatment of scanty menstruation, and of the nervous symptoms accompanying the premature menopause.

He divided oligo- or amenorrhoea into two classes: the one due to the various causes generally given, and the other to deficient ovarian activity, especially in cases where there was at the same time a rapid increase of the fat of the body. In the latter group of cases ovarian extract had been of great value in his experience.

Dr. Storer felt that the nervous symptoms following an early double ovariotomy are frequently of very real importance, and for this reason is apt to leave some ovarian tissue if possible, even in cases of hysterectomy or salpingectomy. In such cases of the operative menopause ovarian extract frequently makes a longer but less trying menopause.

He called attention to the relation of the ovarian function to lactation, and suggested that the ovarian extract might be of service in cases of deficient secretion of milk. While he recognized a possibly psychic correlation between the breast and the pelvic organs, he had found only disappointment in the use of the mammary extract in cases of pelvic disease.

Dr. Reynolds called attention to the more or less antagonistic effect of the corpus luteum extract and that of the whole ovary. He stated that he had been making a study of uterine and vaginal secretion, and he found that removal of the corpus luteum was capable of changing the reaction, and thus the bacterial content of vaginal secretion. He stated that he believed that one of the functions of the corpus luteum was to preside over the nutrition of the genital mucous membranes. He believed that further experimental study was needed.

Dr. D. F. Jones read a paper on

PROLAPSE OF THE RECTUM AND OF THE UTERUS.†

Discussion of Dr. Jones' paper followed:

Dr. Reynolds: Prolapse is a form of hernia, and the same principles should be applied to it. Congenital predisposing causes are of very great importance. A deep posterior cul-de-sac is such a predisposing cause of prolapse.

He believed that closing the posterior cul-de-sac tends to tip the uterus forward and hold it in its normal position by preventing the drag of the weight of intestine.

Dr. Reynolds stated that he thought common rectocele was of different origin,—namely, that the rectum slid upon the fascia of the pelvic floor. He believed, therefore, that a repair of a rectocele involved a blunt dissection and separation of these two structures, a sliding up of the rectum, and suturing of the pelvic floor below.

Dr. J. T. Williams stated that he had satisfied himself that the pelvic fascia was the chief support of the uterus, for two reasons: First, that the pelvic floor is some distance below the pelvic organs which it has been supposed to support, and, second, that the pelvic fascia is a solid membrane, especially in its anterior portion, forming a firm fibrous sling which is inserted into the supravaginal cervix on either side. He believes that retroversion is a late rather than an early symptom of prolapse, and that the cervix is the first portion of the uterus to sink. The utero-sacral ligaments are definite thickenings of the pelvic fascia and serve as guy ropes rather than real support.

He believed in Dr. Jones' operation of suturing the pelvic fascia behind the uterus. He called attention to the danger of wounding the uterine artery, and referred to two cases where this had occurred in performing Dudley's operation for procidentia.

Dr. Williams believed, also, that the fascia as well as the muscles in the perineum gave support. He referred to two forms of cystocele, (1) due to stretching of the structures of the anterior vaginal wall without prolapse of the uterus, and (2) cases associated with prolapse of the uterus.

Dr. Hutchins stated that he had used the principle of closing the posterior cul-de-sac, as recommended by Dr. Jones, in cases of prolapse, for the past year, and that he performed, also, a fixation or suspension of the uterus.

Dr. Lund stated that he had tried various operations for prolapse of the rectum; that amputation of the prolapse was a bloody and formidable operation, and that some of the methods by which the rectum was stitched up from within were to be preferred. It is true that the entire wall of the rectum in prolapse cases cannot be taken up from within, but he believed that as much as possible should be taken up, and the posterior cul-de-sac closed by suture, as advocated by Moschcovitz.

A recognized danger of suture of the sigmoid to the side of the pelvis had been a possible kinking, and to obviate this McArthur had drawn the sigmoid up as far as possible and made an anastomosis between the rectal portion of the sigmoid and the beginning of the sigmoid where it leaves the pelvic brim. In this way, the faeces could pass directly down into the rectum without going through the great loop of the sigmoid, the possibility of obstruction from kinking being removed, and the rectum fixed at the same time. This operation has been successful in Dr. Lund's hands.

Although the upper part of a rectocele may be as described by Dr. Jones, a hernia of the lower part will simply be a bulging into the vagina, as shown by the fact that in denuding it for repair one did not come to the peritoneum but to the rectum. Also in vaginal hysterectomy, where there was a coincident rectocele, in denuding the posterior surface of the cervix, one went up some distance before coming to the peritoneal fold. In Somer's method of perineal repair, the rectum was folded in upon itself in a way which seemed to him aided greatly in curing the rectocele.

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† See Journal, page 623.

Dr. C. L. Scudder reported for the committee on end-results of the treatment of infected joints, that a sub-committee had been appointed consisting of Drs. Irving, Walker, Ehrenfried, Miller and Harmer, and that the collection of data was progressing.

The meeting then adjourned.

(Signed) Robert B. Greenough,
Secretary.

FALL MEETING OF THE NEW ENGLAND BRANCH OF THE AMERICAN UROLOGICAL ASSOCIATION.

Held at the Harvard Club, Boston, Nov. 30, 1915.

President, A. L. Chute, M. D., Boston.
Secretary, R. F. O'Neil, M. D., Boston.

Demonstration of Cases, Instruments and Specimens.

A DEVICE FOR HOLDING THE HAGNER BAG IN POSITION.

Dr. W. W. Townsend: I have a Vermont product which I hesitate to present to this critical audience, but it has been one of great value to me in the retention of the Hagner bag. It is simply a wire frame, the bag being introduced in the usual manner, this clothes-pin wire arrangement is put on to hold the air in the bag. The frame is then slipped over the penis. A piece of gauze is applied at the root of the penis so that the counter pressure against the pubes will not hurt the patient. After the bag is in place the tubular portion is pulled forward and hooked into the hook at the end of the wire, which maintains the traction on the bag very satisfactorily.

END-RESULT OF A CASE OF TOTAL CYSTECTOMY.

Dr. Arthur H. Crosbie: At a meeting last winter I reported a case of carcinoma of the bladder in which I did a total cystectomy, removing bladder, prostate and vesicles. I have now to report that two months ago the man died of a recurrence. I have brought up the specimen to show again tonight as some of you may be intertested in looking at it if you did not see it at the last meeting.

SPECIMEN OF A VERY LARGE PROSTATE.

I would like to show a prostate which Dr. Chute took out. This gland was removed from a man 76 years of age who had led a catheter life for four years. The prostate is remarkable purely because it is so large, the total weight being 320 grams.

A CASE OF EMERGENCY PROSTATECTOMY FOR HEMORRHAGE.

Dr. R. F. O'Neil, Boston: It has seemed to me that the following case presents certain points of interest which make it worth while reporting. The patient was admitted to the G.-U. Service at the Massachusetts General Hospital for severe hematuria. History of urgency, frequency, and inability to hold his urine, for three years. Rectal examination showed a large, smooth elastic prostate. Reflexes normal.

A catheter soon became plugged and the bleeding increased. I then decided to open the bladder suprapubically, check the bleeding, and do a two-stage operation. On opening the bladder under local anesthesia, the knife plunged directly into a solid tumor which proved to be an enormous median lobe practically filling the bladder. Drainage being obviously out of the question for mechanical reasons, gas-oxygen anesthesia was given, and the median lobe, together with two good-sized lateral lobes, was enucleated, in spite of the fact that I knew nothing of the man's renal condition. There was nothing else to be done. He made a good recovery after a rather stormy convalescence, which included a periurethral abscess, epididymitis, and bronchopneumonia.

A CASE OF DIVERTICULUM OF THE BLADDER, AND A CASE OF DILATATION OF THE URETERS SIMULATING BILATERAL DIVERTICULA.

Dr. R. F. O'Neil, Boston: These cases are reported together as they were in the ward at the same time and were supposed to have similar lesions. Case I seems to emphasize the error in diagnosis in Case II.

In Case I the cystoscopic findings were borne out at operation. In Case II operation showed that what we had taken for diverticula were the much dilated ureters; the case being one of the rare so-called cases of insufficiency at the uretero-vesical junction. (The condition has been recently described by Kretschmer, Urological Transactions, Vol. IX.) Had we injected more silver solution into the bladder at the time the x-ray was taken, the true condition would doubtless have been discovered.

Case I. The patient, a man of 40, was first seen in the G.-U. Out-Patient Department of the Massachusetts General Hospital. Presenting symptom, frequency of micturition. He had a turbid urine and a residual, without any obstruction. Cystoscopy showed the orifice of a diverticulum on the right not involving the ureter, and more or less trabeculation of the bladder. He was sent into the hospital for operation. The diverticulum was successfully excised, and the patient made a good recovery, although the urine remained cloudy for a long time.

Case II. G.-U. Service, Massachusetts General Hospital, a young man of 20. Fourteen months ago urinary frequency and pain which had recently stopped. Urine cloudy.

Cystoscopy: On one side, in the general location of where the ureter should be, was a round hole resembling the orifice of a diverticulum, which we assumed it to be, with the ureter emptying into it. An x-ray catheter was passed into this and the radiograph showed the catheter curled in a circle upon itself as if it were coiled up in a diverticulum. The ureter on the other side appeared somewhat dilated, but not to the same extent. A radiograph of the bladder filled with argentide solution showed a bulge on either side. On the evidence of this and the previous x-ray, a diagnosis of bilateral diverticula was made. The renal function was, time of appearance 11 min.; 20% in first hour, 15% in second.

At operation, on opening the bladder, the two openings seen through the cystoscope in the general location of the ureters, were found. Catheters passed into these failed to go any distance. On stripping back the peritoneum and exploring the base of the bladder, these were found to be the openings of the ureters which were enormously dilated all the way to the pelvis of the kidney. Although these orifices appeared somewhat abnormal, their appearance was not such as to cause one to suspect the presence of the tremendous dilatation of the ureters which was found.

Dr. **George G. Smith** gave an account of his experiences as Surgeon to Mrs. Depew's Hospital at Compeigne, France, illustrated by lantern slides.

Dr. **C. G. Mixter** of Boston read a paper entitled,

UNDESCENDED TESTICLE IN CHILDREN.*

Discussion of Dr. Mixter's Paper.

Dr. J. D. Barney, Boston: There is little that I can add from a clinical standpoint to this good paper, but I thought it would be of interest to look up what material we had on this subject at the Massachusetts General Hospital.

In the card catalogue I found there were 198 cases reported in all ages, and that these occurred singly in 185 and doubly in 13. That seems to bear out the testimony of others that bilateral undescended testicles are quite rare. One hundred and thirty-four of these cases, or 66%, were accompanied by hernia of one or both sides. I understood Dr. Mixter to lay more stress upon the hernia than these records would warrant.

In looking over the literature on the subject I find that in 59,000 or 60,000 cases of hernia in children in the hospitals of New York there were only 137 cases of ectopic testicle.

A good deal of stress has been laid upon the occurrence of sarcoma. In our series there were only three cases, a trifle over one per cent. We found hydrocele in only eight cases.

I do not think it is at all strange that we should get hernia or hydrocele because there is a direct communication between the abdominal cavity and the scrotal cavity. I think it is a little more striking that there are so many who do not have hernia.

In regard to sarcoma I find interesting figures. Out of 182,729 admissions to various hospitals in England and in this country, there were 117 cases of sarcoma of the testicle. Only twelve of these were in the ectopic stage, and only three were of the intra-abdominal type, the others being inguinal in one position or the other. And then strangely enough Dr. Bulkly of New York reported two years ago two cases of sarcoma of the ectopic testicle, and found that there were only 59 others reported in the world's literature. This struck me as being quite startling. He came to the conclusion that you might expect sarcoma in one out of every 75 ectopic testicles. My impression was, and I think it is generally supposed, that the ectopic testicle is peculiarly liable to sarcomatous degeneration, but apparently it is far from common.

I would like to ask Dr. Mixter what the indications are for operation on a case of undescended testicle in children. I would like also to congratulate him on his paper.

Dr. G. G. Smith, Boston: I think that it should be borne in mind that atrophy occurs in the spermatogenetic system, and yet not in the interstitial cells of Leydig which furnish an internal secretion. I believe it has been shown by experimental work that although the spermatogenetic function may have entirely disappeared, the cells furnishing the internal secretion are apparently spared.

Dr. Hugh Cabot, Boston: The evidence submitted by Dr. Mixter, that free division of the veins of the cord in bringing down the testicle in operations for failure of descent results in atrophy of the testicle, is a contribution of first-class importance.

This principle of free division of veins was, I think, first advocated in a thorough-going way by Bevan and was perhaps the most important part of his operation. It has been satisfactorily shown by clinical experience that such a free division can be done without causing necrosis and for this reason it has been assumed that it was free from serious objection. Dr. Mixter's contribution goes far to show that though necrosis does not occur, atrophy does, and should this evidence be confirmed by a larger group of cases, division of the veins as a part of this operation must be finally abandoned.

Dr. W. T. Councilman, Boston: In connection with this paper of Dr. Mixter's, I happened to read the other day in the Memoirs of Nathan Smith, which were published by his son, Nathan R. Smith, in Baltimore, the report of one of his operations for hernia in 1823. In this case the hernial mass was very large and solid, and in the course of operation he was much surprised to find in it only a small knuckle of intestine. Outside of this there was a large tumor mass which was composed of a testicle, a hydrocele cyst, with an enormous thickening of the tunica vaginalis. The article contains a picture of the condition.

Dr. J. W. Keefe, Providence: I should like to mention another condition and that is the twisting of the testicle sufficient to destroy the blood supply, producing a necrosis of the undescended testicle.

I know of an instance of a child about one and a half years old which had that result. The physician was called, and thought he had an inguinal gland, and he applied ice, and later the swelling persisted and I found it necessary to remove the testicle. Another interesting point about this case was that the father of this boy, when he was a man about 26 years of age, had the same condition, when the late Dr. Maurice Richardson saw the case with me; and he made a diagnosis previous to the operation, that we should probably find the testicle so twisted that the blood supply was interfered with.

I have felt that many of these cases are atrophied testicles.

In regard to the fact that sarcoma results, the books have told us that it frequently happens. I recall the case of a doctor some 75 years of age who had enlarged prostate for which I operated, and he had two undescended testicles in the inguinal canal. It may be as Dr. Barney has shown, that we do not find sarcoma of the testicle so frequently as the books have taught us in the past.

Dr. G. G. Smith, Boston: I should like to ask Dr. Mixter if he remembers what age the children were who had the atrophied testicles. There were two of them, he said, that were atrophied at the time of operation.

Dr. J. D. Barney, Boston: On the other hand, I recall the fact that in a paper published by McGlannan in 1913, it was shown that the spermatogenetic function is not done away with as frequently as we supposed. In many cases it was still persistent, as shown by the microscopic sections of the testicles, and in the cases in which it was supposed that there were no spermatogenetic cells, there were plenty of them.

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* See Journal, p. 631.

DISCUSSION CLOSED BY DR. MINTER: The one point which I wanted to make was that I consider this, the Bevan operation, of complete section of the spermatic veins in children, a dangerous procedure as far as the developmental result goes. I think that if this small series is of any value the fact that every case in which complete section was done was followed by atrophy is pretty striking, to say the least.

On the other hand, in every case reported in which the vessels were left absolutely intact, no atrophy resulted.

I cannot of course speak in any way about the spermatogenetic function in these cases.

In regard to the indication for operation on undescended testicles in children, one point is the fact that of this relatively small series two cases showed marked atrophy at the time of operation. Those two cases were out of 30 cases operated on.

I cannot tell you the exact ages of those two children, but my remembrance is about six and nine years respectively. The indication for operation in younger children is, as I said,—in the first place, where there is evidence of a beginning atrophy, and in the second place, where the hernia gives rise to trouble and not on account of the testicle.

I see no reason why the testicle should not be operated on after three years or some age in that vicinity, because I think as good a result can be expected as there can be in older children or adults, and there is less danger of atrophy occurring spontaneously.

DR. HUGH CABOT of Boston read a paper entitled:

THE MECHANISM OF THE PROTECTION AFFORDED BY THE DRAINAGE OF PROSTATICS AS A PRELIMINARY TO OPERATION.

A Consideration of the Production of Immunity.*

DISCUSSION OF DR. CABOT'S PAPER.

DR. W. T. COUNCILMAN, BOSTON: I have been much interested in Doctor Cabot's paper. A great part of it is outside of my province, but the main point of the paper, as I understand it, is the production of immunity before operation, and this seems to me very interesting. It must make an enormous difference whether in consequence of an operation an infection is produced in an individual previously free from infection and who has no immunity, or whether the infection is produced in an individual who has already acquired a very high degree of immunity. The degree of immunity which these patients sometimes attain seems to me very remarkable. I some time ago performed an autopsy on an old gentleman over seventy, who for over twenty-five years had been accustomed to use a catheter eight times daily. The catheter was carried in his pocket, and he was accustomed to lubricate it with saliva in order to facilitate passage. In the course of his life he had had numerous infections in the urinary tract, in the epididymis and prostate, and most of these parts had become sealed off from the urinary tract by chronic inflammation. There was a constant cystitis of not very high degree. For some years before death there had been no infections, and the general condition of health was good. At the autopsy I expected to find in the kidneys evidences of old abscesses, a high degree of pyelonephritis, and general atrophy of the kidney. I found nothing of the sort. The kidneys were extremely good for an individual of that age, and there was only a slight degree of thickening of the pelvis.

What Doctor Cabot has said is also in agreement with what many of us are thinking in these days; the very great care to avoid infection, in food, in milk, and by our manner of life, may not be wholly to the good. We are possibly doing ourselves harm by not developing immunity to infection, which can take place only by our acquiring infection; it can easily happen that at some time a malignant strain of some organism may be encountered which in the absence of all immunity may be attended with serious results. Possibly the milk epidemics which have been so severe a few years back, may have been associated with this rather artificial absence of immunity. It seems, however, a very novel thing that the surgeon, whose efforts are directed generally to the avoidance of infection, should deliberately produce it. A second point in Doctor Cabot's paper is in regard to the mode of infection. There is nothing more difficult in pathology than to determine in the first place the point of entry of organisms into the tissues, and secondly the mode of extension of the infection from the primary focus. There are so many possibilities in regard to this. If we take for example the progress of such a disease as tuberculosis of the lung: every channel of infection is called into play, such as blood vessels, lymphatics, the surfaces, etc. In all infections the extension by means of surface plays an important part. The extension of infection along the urinary surfaces is very important, and affords an interesting example of surface extension. The pathologists recognize distinctly two modes of infection in the kidney: the hematogenous or the descending and the urogenous or the ascending. I have thought that Doctor Cabot rather doubts the latter, especially from some rather sarcastic utterances of his with regard to the hypothetical natatory powers of the tubercle bacillus. Infection can very easily take place along a surface in a direction contrary to the flow over such a surface. One of the examples of this is the extension of infection from the mouth to the parotid gland. There the infection extends through a narrow channel which is well protected by an epithelial surface and against a pretty constant current. It is sometimes very difficult from the anatomical lesions to interpret the mode of infection. In the kidney both the hematogenous and urogeneous are frequently combined. In the pyaemic diseases, such as scarlet fever, diphtheria, ulcerative endocarditis, we frequently find foci of suppuration in the kidney which are definitely hematogenous in origin. They are usually most prominent in the cortex. There are also undoubted cases in which there is infection of the kidney which follows upon infection of the pelvis of the kidney. There are certain anatomical distinctions between the two. In the urogenous infection, the lesions are chiefly in the pyramid, and we find in this and extending from it, long white lines of necrosis with central masses of organisms. It is perfectly possible, however, to have an infection begin in the cortex of the kidney and extend downward along the urinary tubules, in which case the most marked lesions may be in the pyramid of the kidney. Even in the hematogenous infections, the lesions may be more marked in the pyramid of the kidney, and may closely simulate a urogenous infection, because the organisms may pass through the capillary circulation and find lodgement in the long veins of the pyramid. If a culture of staphylococcus aureus is injected into the ear vein of a rabbit there are always lesions produced in the kidney which are usually more marked in the pyramid than in the cortex. In tuberculosis, undoubtedly both modes of infection take place and they are difficult to distinguish. In general miliary tuberculosis, the tubercle formation is most pronounced in the cortex, but even here the lesions may be in the pyramid and from the cortical lesions there may be a further descending infection. The pelvis of the kidney, moreover, in tuberculosis, can become infected, and from this point the infection can again advance toward the kidney. On the other hand, we undoubtedly find cases of ascending urinary tuberculosis, in which the lesions below are undoubtedly of an older date than the lesions in the kidney. There is no difficulty, it seems to me, in regard to the passage of organisms from the bladder upwards. We must not think of the flow of urine in the ureters as a rushing torrent, carrying all before it, against which the weak bacillus has to struggle, but conditions easily arise in which there is no current at all, and organisms in one part of the common fluid in the bladder and ureter can be diffused through the fluid by means of the currents which are always present. Such currents may be produced by the intermittent pressure coming from the intestines or in various ways. It is also perfectly possible for the tubercle bacilli to advance along the surface from point to point, finding lodgement on the surface and growing there. In regard to the excretion of organisms by the kidney, I have always had a great deal of doubt as to whether this does take place without lesions. Lesions of the kidney are extraordinarily common in all of the infectious diseases, and from such lesions the organisms can enter into the urine where they will multiply and a condition of bacilluria which may be long in duration will be produced. This seems to me to be the case in typhoid, for instance. The experimental evidence which we seem to have, in which very large quantities of organisms are injected into the blood and later make their appearance in the urine, does not seem to me to be worth much unless accompanied by the most painstaking examination of all parts of the kidney. I always like to hear these clinical papers, especially when presented so ably as the papers were this evening, and I always regret the lack of clinical knowledge on my part, which prevents an adequate discussion.

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* See JOURNAL, page 633.

Dr. A. L. Chute, Boston: This general subject is something that has been of the greatest interest to me and upon which I hold pretty definite opinions that I have set forth in one or two papers written within the past few years. To me Dr. Cabot's theoretical views as to the source of these infections are extremely interesting but not wholly convincing. His suggestion regarding vaccination as a possible method of preventing or minimizing these infections is very attractive, but its value is not as yet proved; and I wish to warn against a too enthusiastic following of this method until we have more definite knowledge regarding it. It seems to me that there are several reasons to make us slow in adopting it until we have further evidences regarding its value.

From the theoretical point of view, I am in doubt about one's ability to immunize these men with colon vaccine. If this were possible, more of the very constipated patients ought to develop a pretty good natural immunity, and yet we rarely see men who seem to show any signs of this.

Another objection to the plan is that it takes time to immunize patients by vaccination, and often one can ill afford to spare this time in the prostatics with bladders overdistended with clear urine. My greatest objection, however, is that in following this method we should be substituting a cumbersome way, even if it were demonstrated to be an efficient way, for ths simpler method of opening the overdistended bladder under novocaine and draining by means of a large suprapubic tube. This way, it is true, does not prevent infection of the bladder but it prevents, to a very large degree, the harm which comes from this infection; namely, the serious infection of the kidneys. Combined with this combating of the infection, it has the advantage of relieving the kidneys of the mechanical factor of back pressure in a manner that is more complete than is possible with any other way of drainage. The fear of serious collapse from opening an overdistended bladder or the danger of serious hemorrhage are under these conditions, so far as my experience is concerned, mythical, when this operation is carried out under local anesthesia.

I am sure we all appreciate Dr. Councilman's kindness in coming here this evening and giving us so clear an exposition of the pathology of the condition under discussion.

Dr. E. G. Crabtree, Boston: We recognize that in the paper which Dr. Cabot has just read there is a radical departure from the well-beaten textbook path of consideration of pyelitis. We regret that the paper is of necessity based upon incomplete evidence and a rather small number of cases, yet certain definite facts are indicated which have some bearing on the general subject. It is to be hoped that our search for truth may not seem to lead to our discomfiture as in the case of the man who, searching for stars by day, fell into a well.

Certain evidence has been produced in experimental laboratories which indicates that the kidney has a definite excretory action for bacteria. I have myself endeavored to demonstrate the point and, following the suggestion of Carl Ten Broeck, injected attenuated cultures of para-typhoid bacillus into the ear veins of a rabbit and recovered them from the urine in large numbers 48 hours later. A drop of urine from the bladder, which previous examinations had shown to be sterile, gave innumerable colonies on the culture media.

In regard to the existence of a blood infection during pyelitis, to which Dr. Cabot referred in his paper, certain evidence has been produced in our clinic. I have taken blood cultures on 32 cases, including 9 cases of prostatics with uninfected urine at the time of entrance into the hospital. These cases all showed a clinical picture of pyelitis at some time during their stay in the hospital. I have obtained positive cultures of the colon bacillus in 13 cases. Of the 9 prostatics examined, positive blood cultures were obtained in 7.

The demonstration of the results of vaccination is a difficult problem and must rest on clinical as well as laboratory findings. In so far as agglutination is a fair test of protection, the use of vaccines has apparently accomplished some good. There is some evidence that infection itself produces immunity. It has been found in 3 cases in which there had been more than one attack of pyelonephritis and in which the colon bacillus had been recovered from the blood, there was a distinct increase in the agglutinating power of the serum. Likewise I was interested to find in the case of a man who had recently had 4 attacks of epididymitis due to the colon bacillus, his agglutinating power was much increased although he had not been vaccinated.

In cases in which colon bacilli have been recovered from the blood, there are two possibilities to be considered: one, that the infection enters the circulation from some point outside the genito-urinary tract; and the other, that the blood is infected from an infected kidney. In our one case where careful bacteriological and cultural evidence has been produced, we obtained a positive culture from the blood previous to the appearance of the bacilli in the urine. Bearing upon this subject, last month's issue of *Jahrbuch für Kinderheilkunde* contained a review of some work by Kowitz, who had traced the order of appearance of bacteria, pus and albumin in 5 children in whom pyelonephritis developed in the course of an infectious diarrhoea. He found the order of appearance to be 1. albumin, 2. bacilli, and 3. pus. In regard to the frequency of blood infection in infectious diarrhoea, the same author quotes Baer, who found in 117 cases of infectious diarrhoea positive blood cultures of colon bacillus in 65.

I have recently read in the literature, but do not know what significance to attach to the observation, that in leprous and tuberculous patients the use of salvarsan is followed by showers of the respective bacteria in the urine and often attended by spread of the disease.

In obtaining blood cultures of the colon bacillus, my experience has shown that it is useless to take the cultures at any considerable time after the onset of symptoms. I took blood cultures later, for a time, with almost uniformly negative results. Apparently the only time at which positive results may be obtained is at the very beginning of symptoms of pyelonephritis. Likewise in cultivating the colon bacillus from the blood, inasmuch as the immunizing power of this organism is less than that of the typhoid bacillus, the amount of blood which can be taken without danger of interference with growth is considerably greater. I take 10 cc. for each flask of culture media.

DISCUSSION CLOSED BY DR. CABOT, BOSTON: The discussion between those who have regarded renal infections as commonly haematogenous in origin and those who have regarded them as generally urogenous has long been violent and has acquired the dignity of antiquity.

It was not our intention to stir this hornet's nest at this time, though we shall have much to say on it later. However, as the question has come up, it is proper to indicate our views at this time.

The advocates of urogenous or ascending infection as the common source have always had an attractive doctrine and one peculiarly seductive to the unwary. Its weakness has lain in the fact that it has postulated certain conditions which are difficult of demonstration and which, in our opinion, do not in fact exist. In many of these cases of acute colon bacillus pyelonephritis the infection occurs in persons having no previous lesion of the lower urinary tract and in whom there is no condition likely to produce one. This is particularly true of the cases occurring in children and in women, more especially in relation to pregnancy, and yet in these cases the lesion is precisely similar and the disease runs the same course as in those having some pre-existing lesion of the lower urinary tract. The advocates of ascending infection have had to disregard entirely the notorious fact proved both clinically and by animal experimentation, that the bladder is peculiarly resistant to infection introduced through the urethra and that in the absence of retention, infection of that organ can be produced only with the greatest difficulty. Under these conditions, to assume that the colon bacillus transverses the urethra, infects the bladder, ascends the ureter and involves the kidney requires a feat of imagination which is quite beyond us.

In favor of the excretory origin of these infections is the also well known fact that colon bacilli circulate in the blood and are excreted by the kidney under a great variety of conditions, in many of which their presence has been entirely overlooked. The best recognized cases are those of the first cousin of the colon bacillus, the typhoid bacillus, in which the excretion of the bacteria by the kidney has long been recognized. We believe that evidence is at hand to show that the colon bacillus behaves in a precisely similar fashion and that his presence in the kidney is extremely common. Thus the believers in the excretory theory can at least deliver the colon bacillus at the kidney without straining their imagination and from this point explanation of the lesions becomes a simple matter. This makes it incumbent upon the advocates of the theory of ascension to show a previous lesion of the lower urinary tract, most commonly of the obstructive type and clearly antedating the infection of the kidney. Where this can be shown, ascending infection is about as likely, though not more likely, than excretory infection, and in these cases the two types are theoretically on a par. We believe that the ascending theory of these infections has seen its best days and that in the future it will be on the defensive rather than on the offensive and will play a losing game. That it will ultimately be proved to account for a certain proportion of cases is probable, but these will, we think, be the minority.

In regard to Dr. Chute's views, I hope, with him, that the theories we have put forward this evening of what it may be possible to do, will not stampede anyone. I confess I have little fear of stampeding this gathering and yet if it should succeed in drawing some surgeons away from the method of two-stage prostatectomy, to which Dr. Chute is apparently wedded, I cannot believe that much damage will be done. The two-stage operation seems to me unsatisfactory and I am not prepared to admit that it avoids the infection of which we have been talking this evening any more surely than do other methods of drainage. Furthermore, in my hands it has not been certain to avoid a considerable mortality. The two-staged method, as proposed by Dr. Pilcher at our meeting last winter, seems to me clearly preferable to any other method that I have seen, but even this I am by no means clear that we are not unnecessarily wasting the patient's time and requiring confinement to bed for a period which with these patients is certainly serious. The two-stage operation is unsatisfactory, and if by a process of previous immunization we can avoid it, I think we shall have accomplished an important result.

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HUMAN TYPES IN THE ADOLESCENT PERIOD.

NUMEROUS papers have recently been presented, several of them in this JOURNAL, bearing upon what might be called the theoretical side of the question of type in the human, as expressed by the words carnivorous and herbivorous, or their synonyms. To the theory of type it has been objected that, even should it prove true in its entirety, it would yet remain without practical value. This objection seems by way of being refuted: thus Bryant has mentioned two independent practical investigations in progress. One, by Dr. Hodskins of Monson, is a study of type in relation to the single disease group of epileptics. The other concerns itself with manifestations of type in school children. Notes upon the second of these studies are now available, for Dr. Lewis of Worcester has published his results of an examination of 547 unselected school children in his city under the title "Adolescent Physical Types: A Preliminary Study."

Having extensively considered the literature, Dr. Lewis proceeds to review his material, dividing it into three classes or types of body form, under the headings carnivorous, herbivorous, and neutral or ideal normal. The most striking fact elicited is that out of a group of over 500 boys of school age, less than 50, or 10%, could be placed in that favored normal group which since before the days of Phidias and the Golden Age of Greece has been held representative of the ideal in the physical development of man. The word "favored" is used advisedly, since his study has convinced Dr. Lewis that the fortunate few in this select ideal normal group possess within their perfectly formed bodies not only a maximum of resistance to disease, but a maximum prospect of a superior mentality. Thus is additional scientific evidence—were further needed—available in support of the truth of the ancient empiric proverb of the sound mind in the sound body. Scarcely less striking than the small incidence of the ideal group, is the fact that this 10% appears to represent, so to speak, a total effort of nature in the matter of perfection, since the 10% runs practically constant, regardless of race or social status.

Anatomies are written and illustrated, and medicine is taught according to this investigation, then, upon a basis of but 10% of humanity. As a result, when the young graduate in medicine is confronted by a patient, he may have the satisfying thought that there are about nine chances to one that the patient he is considering is not built according to the plan which he has so diligently studied.

What may we learn of these other nine people in ten? Dr. Lewis finds that his boys are not grouped evenly upon either side of the normal, but that they fall in the proportion of two to one on the carnivorous side of normal, with this tendency even more strongly shown among those of American birth.

If for every normal there are three herbivores and six carnivores, it becomes of some interest to know what physical and mental tendencies may be found in these predominating groups, with their 100% excess of carnivores. Dr. Lewis gives direct support to previous observations on the types, as follows: "My statistics indicate, first, that *good* posture, muscular function, nutrition and teeth are correlated with the neutral or omnivorous type; second, that *fairly* *good* posture, muscular function, nutrition and teeth are correlated with the herbivorous type; third, that incorrect posture, physical defects, prominent lower abdomen (visceroptosis), insufficient muscular function, poor nutrition, defective teeth and rickets are correlated with the carnivorous type.

In general, the boys of the carnivorous group are weak, poorly nourished, lacking bone and muscular resistance in addition to having poor posture. Often the history shows diseases and other defects which greatly reduce the vigor and health of the boy, decrease his resistance to abnormal and long-continued strain, and predispose him to spinal curvature and the like. The history of diseases, as recorded on the cards, shows that headache, measles, scarlet fever, pneumonia, pleurisy, tonsillitis, and convulsions occurred about three times as frequently in the carnivora as in the herbivora. Invariably, the boys with poor marks in studies were poor in physical training.

In all types there seemed to be a direct correlation between physical and mental activities. The best marks for study and training were found in the neutral group. There were only three fair grades in study, and all grades good or excellent in physical training. Seventy per cent. of the herbivorous type have good or better grades in physical training and about 30% good in studies. Fifty per cent. of the carnivorous type have good or better in physical training, and about 30% good in studies. There were no failures in studies in the neutral group, two in the herbivorous group, and eight in the carnivorous group."

From these figures it appears that two-thirds of these 500 boys belong in a type proved to be about three times as subject to disease as the next most frequent group of boys. Further, it appears that this most numerous group is the worst developed physically. Yet, if complete failures are eliminated, it appears, that in spite of the physical handicaps which predispose to poor mentality, the average grade in studies is no worse for the poorly nourished carnivore than it is for the more perfectly developed herbivore. One inference is, perhaps, that were the carnivore given an equal chance physically, he might excel the herbivore mentally.

Whatever inferences may be drawn, however, such findings as these of Dr. Lewis are worthy of serious thought by all interested in matters educational, and in the newer aspects of preventive medicine, and it is to be hoped that this is, indeed, but the forerunner of many similarly interesting and valuable practical studies in human development.

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HEMATOGENOUS INFECTIONS.

Reports of certain laboratory investigations, not generally accepted but worthy of much attention (Rosenow), indicate a possible great extension of the field now occupied by the streptococcus in pathology. Diseases now generally believed to be due to a blood-carried infection are mainly endocarditis and arthritis. Others quite probably always in this category are pyelitis, chorea (of the non-imitative type) and purpura. If we are to include also gastric ulcer, appendicitis, neuritis, myositis and other such disease conditions, we shall have a group as distinct and as large as that of syphilis and greater than that of tuberculosis.

Excluding the colon group represented by pyelitis and perhaps some forms of arthritis, the principal part of these diseases represents, we believe, a streptococcus infection which gets into the blood stream almost certainly from the mouth, throat, eyes, ears, nose, or a wound of the skin. Of these possible sources, the teeth or tonsils are nearly always the most likely. Bacteriologists (Ernst) believe that such a streptococcus is not present in the gastro-intestinal tract.

Removal of these sources and the administration of some antagonistic drugs after the disease is once started is not satisfactory treatment. Once lodged in the tissues of the body, the organism or its effects are very persistent.

What is to be emphasized is that practically all of this large group of diseases can well be considered to originate from primary disease of teeth or tonsils; that once started, consistently successful treatment cannot be said to have been achieved; and that the majority of physicians are still so careless as not to accomplish the prevention of these infections. It remains to be seen whether a pediatrist cannot definitely promise freedom from all diseases of this type so long as a patient obeys his directions. Prevention, we think, should start in infancy, and begins with the maintenance of good health. Given a healthy infant at six months, it is questionable whether we utilize his good digestion to his best advantage by not choosing his food for a more distant future than we can for those in poor health. Do we not too often sit back and watch him gain weight satisfactorily on a simple milk diet?

Durand of Seattle, Owre of Minnesota, Wallace of London, and others, publish favorable results of this choice of food on the teeth. Ordinarily, suppuration about teeth is easily seen if looked for. Cases in which a pus pocket can be detected only by x-rays are so common, however, that this method may be much too infrequently used. Just when this examination may be safely omitted has not yet been determined, so it may be more safe to use it in every case where a tooth is badly carious, even if the gums seem healthy. In children with poor teeth, a routine examination by the x-ray ought to be made every six months. Most dentists cannot guarantee complete safety in cases of suppuration by treatment without extraction. We think that safety from these diseases is more valuable than the retention of inferior teeth which, it is conceivable, may transmit disease to other healthy teeth in contact.

Radical treatment of all even faintly suspicious tonsils may seem impracticable, but it must be remembered that in childhood the painful convalescence, which is the worst of the operation for adults, is very much shortened—in fact, it is the usual thing for such a patient to eat and talk without difficulty on the morning after operation. Before and after such an operation, which in some cases has seemed to be coincident with the entrance of organisms into the blood stream, salicylates may be given, perhaps with greater security.

THE NEW ENGLAND TUBERCULOSIS CONFERENCE.

At the recent New England Tuberculosis Conference, held October 12 and 13, at New Haven, delegates representing all the New England States, and others to the number of nearly 300, were present. The atmosphere of this conference was a distinctly medical one, and as such, to those interested in the tuberculosis campaign, was very encouraging. There has been an evident and growing tendency on the part of the medical profession, and especially so on the part of social workers, to regard tuberculosis as no longer a medical problem, but a social and economic one. While to a certain extent this is true, and while the social and economic aspects of this disease must receive careful consideration, fundamentally, however, we believe that the medical side of the problem is most important. That this is coming to be regarded the prevailing opinion in Massachusetts is shown by the fact that the Massachusetts Medical Society, for the first time, sent delegates to this conference. The Suffolk District Society and certain others, likewise, sent delegates. The State of Massachusetts was represented by the Trustees of Hospitals for Consumptives, the superintendents of the four State sanatoria, and others. There was present a surprisingly large number of general practitioners and of other physicians who are not ordinarily greatly interested in the tuberculosis campaign. As the early diagnosis of this disease rests almost wholly with the general practitioner, the presence of so many at this conference was an encouraging sign. It is to be hoped that the Massachusetts Medical Society will come to take an increasing interest in this disease and its prevention, and to realize that through its members, largely composed of general practitioners throughout this Commonwealth, the solution of the tuberculosis problem, in a large part, rests.

PROGRESS OF POLIOMYELITIS.

During the past week the epidemics of poliomyelitis have declined throughout the United States. On October 29 the number of cases in Massachusetts reached a total of 647 during the current month. On October 22 there were 58 cases in Quincy, and on October 26, 97 in Holyoke, with 21 deaths. Since January 1 there have been 1660 cases in Massachusetts.

Since July 1, there have been 420 cases and 117 deaths from this disease in Boston; and 90 cases with 15 deaths in Providence, R. I.

The weekly report of the United States Public Health Service for October 20, 1916, shows that from July 1 up to October 15 there had been 3917 cases in New Jersey, 3497 in New York State, exclusive of New York City, 1561 in Pennsylvania, 1427 in Massachusetts, 812 in Connecticut, 784 in Minnesota, 749 in Illinois, 428 in Michigan, 400 in Ohio, 351 in Wisconsin and 254 in Maryland.

In the issue of the *Journal of the American Medical Association* for October 21, is published a preliminary note by Dr. E. C. Rosenow of Rochester, Minn., Dr. E. B. Towne of Boston, and Dr. G. W. Wheeler of New York, on the etiology of epidemic poliomyelitis. After reviewing the earlier work of Flexner and others on the isolation of the causative organism of the disease, they report the isolation from the throat, tonsils and central nervous system in cases of poliomyelitis of a peculiar streptococcus. By intravenous and intracerebral injections of cultures of this organism they have produced paralysis in animals of various species and have recovered the organism in pure culture from their nervous system. The symptoms and lesions produced are characteristic of poliomyelitis. The relation of this organism to that demonstrated by Flexner cannot yet be definitely stated, but the authors believe that the two may represent polymorphous forms of the same coccus under varying cultural conditions.

There is no further recent advance in the treatment of the disease. The Harvard Infantile Paralysis Commission has recently reported that of the cases in which therapeutic blood serum has been employed, none has completely recovered from paralysis, but only two have died.

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MEDICAL NOTES.

TEETH OF RURAL SCHOOL CHILDREN.—A recent investigation made by the U. S. Public Health Service, in connection with studies of rural school children, showed that 49.3 per cent. had defective teeth, 21.1 per cent. had two or more missing teeth, and only 16.9 per cent. had had dental attention. Over 14 per cent. never used a tooth brush, 58.2 per cent. used one occasionally and only 27.4 per cent. used one daily.

PREVALENCE OF DISEASE IN THE UNITED STATES.—The weekly report of the United States Public Health Service for October 20, 1916, states that during the month of September there were reported in Maryland, 49 cases of malaria and 575 of typhoid fever. During the same period there were 80 cases of typhoid in Wisconsin and 16 of cerebrospinal meningitis and 373 of typhoid in Massachusetts. During the month of August there were in Virginia 2069 cases of malaria, 40 of pellagra and 1,107 of typhoid. There were 475 cases of typhoid in Kansas in August.

GERMAN DEATH RATE.—Report from Berlin on October 21 states that whereas in 1913 the German death rate was only 14 per thousand, the rate in 1914 was 16.1, in 1915, 19.7, but for the first seven months of 1916 fell to 16. These effects are attributable almost wholly to the war. Notwithstanding this, however, the infant mortality, which in 1912 was 14.1 per hundred new births and 15.6 in 1913, dropped in 1914 to 14.5 and in 1915 to 12.9.

EUROPEAN WAR NOTES.

SALE OF TETANUS ANTI-TOXIN.—Report from New York on October 19 states that since the outbreak of the European War the health department of New York City has sold to the allied powers nearly $106,000 worth of anti-toxin, chiefly for tetanus. A very small amount has been sold during this period to the central powers, who have manufactured their own supply.

MEDICAL UNIT FOR PALESTINE.—Report from New York on Oct. 19 announces that arrangements have been made by the Zionist Committee of that city to send a medical unit of ten physicians and five nurses to Palestine, aboard the Syrian relief ship soon to sail from New York under the auspices of the Red Cross. The consent of the United States Department of State has been obtained for this purpose and it is planned, after landing the unit at some Mediterranean port, to transfer its members to Palestine aboard a United States warship. The purpose of the unit is to undertake the care of patients with typhus fever and Asiatic cholera, which are now epidemic in Palestine.

AMERICAN RELIEF COMMITTEE FOR GERMAN BABIES.—Report from New York on October 10 states that the American Relief Committee for German Babies, which was organized in Berlin at the outbreak of the war, by Americans resident in that city, now has about 1200 babies under seven years of age in its care. The beneficiaries are selected by the committee and the funds distributed by the German Red Cross.

"The only beneficiaries of this fund are widows and orphans of soldiers slain in battle. Having chosen the family, the chairman of the American Committee, himself an American, directs the Red Cross there to make a monthly payment of $10, and an effort is being made to pension each family for a full year.

Recent reports received at the main office of the Committee, No. 13 Park Row, New York City, show that the scheme is working out to perfection. The Berlin Red Cross has expressed its thanks, and those of its beneficiaries on more than one occasion through the medium of the wireless.

The American Relief Committee is a nationwide organization, of which George B. McClellan, former mayor of New York, is national chairman, and John D. Crimmins, national treasurer. An additional office is maintained in Chicago at No. 220 South State Street, where Frederic W. Upham is chairman, and Charles G. Dawes, president of the Central Trust Company of Illinois, is treasurer. Members of the committee pay all operating expenses and funds donated are transmitted without deduction to the other side.

The committee has so far raised approximately $50,000 and transmitted it by wireless to the other side, and no less than four hundred families are under its constant care."

MEXICAN NOTES.

New Red Cross Bureau in New York.—To facilitate the dissemination among Red Cross chapters of information about the needs of European War sufferers, the American Red Cross has established a special information bureau in the Metropolitan Tower, New York, under the charge of Mr. Albert W. Staub, Superintendent of the Red Cross Receiving and Shipping Station at the Bush Terminal, Brooklyn. Mr. Staub will fill the two offices. His experience during the past two years as head of the Receiving and Shipping Station, and the steady correspondence which his office has with the receiving and forwarding representatives of various recognized relief agencies in Europe, will enable him to keep the more than two hundred Red Cross chapters in this country constantly advised as to the needs of the foreign Red Cross societies and representatives.

Status of a Red Cross Base Hospital Unit.—The twenty-five Red Cross base hospitals, which have been organized or are being organized under the Department of Military Relief of the American Red Cross, have a strictly war-time purpose and are not generally available for use for civilian relief after disasters other than war, according to a Red Cross circular just issued. It says:

"Attention has been invited by the director of a Red Cross Base Hospital Unit to a misconception of the purposes of this military unit, in that a statement has been made that it would be available for purposes of civilian relief in great disasters other than war.

"This is an error, as base hospitals are purely military units, organized at the request of the Medical Departments of the Army and Navy, and equipped with a view to the needs of the military service only. In both organization and equipment they are too massive and too immobile for civilian relief work. The muster-in pledge contemplates only national service, when called into the military service of the United States; and it has been decided by the Judge Advocate General of the Army that the law does not authorize the calling out of these units by the President except in time of war or when war is imminent.

"It can be well imagined that in time of great national disaster, such as an earthquake, which involves injuries to large numbers of people, the staff of a base hospital unit might volunteer *as individuals,* and the American Red Cross would not hesitate to use the blankets, surgical dressings, and such other parts of a base hospital equipment as might be suitable for first-aid work to relieve an emergency. These supplies would, however, be regarded as a loan, and would be promptly replaced, if possible, from funds contributed to relieve the disaster. There would be no calling out of the unit *as a unit,* under these circumstances, and no compulsion on any member of it to volunteer."

War Relief Funds.—On October 28 the totals of the principal New England relief funds for the European War reached the following amounts:—

Belgian Fund	$161,327.07
French Wounded Fund	130,050.27
Serbian Fund	104,649.07
Armenian Fund	80,705.05
French Orphanage Fund	67,906.91
British Imperial Fund	67,742.91
Surgical Dressings Fund	54,592.66
Polish Fund	46,620.83
Belgian Tobacco Fund	40,668.76
Permanent Blind Fund	19,004.12

BOSTON AND NEW ENGLAND.

Week's Death Rate in Boston.—During the week ending Saturday noon, Oct. 28, 1916, the number of deaths reported was 227, against 180 for the same period last year, with a rate of 15.57, against 12.54 last year. There were 38 deaths under one year of age, against 34 last year, and 66 deaths over 60 years of age, against 39 last year.

The number of cases of principal reportable diseases were: diphtheria, 48; scarlet fever, 18; measles, 4; whooping cough, 6; typhoid fever, 5; tuberculosis, 37.

Included in the above were the following cases of non-residents: diphtheria, 9; scarlet fever, 6; typhoid fever, 1; tuberculosis, 37.

Total deaths from these diseases were: diphtheria, 1; measles, 1; whooping cough, 1; typhoid fever, 1; tuberculosis, 19.

Included in the above were the following deaths of non-residents: tuberculosis, 2.

St. Luke's Guild.—The annual meeting of St. Luke's Guild, held recently at the Carney Hospital, South Boston, was attended by over fifty members. Dr. John T. Bottomley was elected president for the ensuing year, Dr. John R. Slattery vice-president, and Dr. John J. Sullivan, secretary and treasurer.

CHARLESGATE HOSPITAL TRAINING SCHOOL.—The first graduation exercises of the Charlesgate Hospital Training School for Nurses were held recently in Cambridge under the presidency of Dr. George Bates. Diplomas were awarded to a class of ten pupil candidates.

CONSUMPTIVES' HOSPITAL CLINIC.—It is announced that the clinic for the study of tuberculous cases which, for some time, has been conducted at the Maverick Dispensary, East Boston, jointly by the Dispensary, the Consumptives' Hospital Department and the Boston Association for the Relief and Control of Tuberculosis, will hereafter be conducted by the Consumptives' Hospital Department alone.

MILK DEALERS' ASSOCIATION.—The annual convention of the International Milk Dealers' Association, held in Springfield, Mass., on October 17, was attended by over 150 delegates. The leading address was by Dr. John Lovett Morse on "Milk for Infants."

"Approximately 300,000 babies die in the United States annually. If that number of infants die each year there are many millions of sick babies. A large percentage of the deaths is due to poor milk, which comes from diseased cows.

"Of the total number of cases there are about 1500 deaths a year from tuberculosis which can be traced to milk from the dairy cow. The only way to protect the public health from such diseases as tuberculosis, typhoid fever, diphtheria, sore throat and scarlet fever is by pasteurizing the milk from the cow.

"The sooner the milk dealers of this country realize that it lies within their power to save the lives of infants, fewer babies will die. The question of reducing infant mortality, in other words, is directly up to the milk dealers, who should speedily adopt measures to safeguard the public health."

Other addresses were delivered by Mr. James O. Jordan on "A Municipal Milk Supply," and by Professor W. B. Frost of the University of Wisconsin on "Milk Bacteria Count and Microscopic Test for Pasteurized Milk."

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Miscellany.

AMERICAN SOCIETY FOR THE CONTROL OF CANCER.

THE American Society for the Control of Cancer has recently issued the following report of its organization and activities as presented to the various special societies at the Congress of American Physicians and Surgeons held in Washington in May, 1916. The Cancer Control Society having been formed under the direct auspices of these national medical organizations at the Congress of 1913, the present report was submitted as a summary of progress during the intervening three years in the effort "to disseminate knowledge concerning the symptoms, diagnosis, treatment and prevention of cancer, to investigate the conditions under which cancer is found and to compile statistics in regard thereto."

REPORT TO THE CONGRESS OF PHYSICIANS AND SURGEONS, MAY, 1916.

At the ninth meeting of the Congress of American Physicians and Surgeons held in Washington in May, 1913, the American Gynecological Society presented to the other branches of the Congress an identical resolution requesting the appointment of two or more delegates to coöperate in forming a national organization to conduct educational propaganda regarding the prevention and cure of cancer. The Gynecological Society had just adopted the report of its committee which had been at work on this problem for a year or more previously, and had recommended that a special society should be established with the sole purpose of conducting this much-needed campaign of education and the collection of data on a nation-wide basis and on a general plan similar to that of the National Association for the Study and Prevention of Tuberculosis. In preparing its report and recommendation the committee of the Gynecological Society had secured the interest and promised support of a group of lay citizens of New York, five of whom, Messrs. John E. Parsons, V. Everit Macy, James Speyer, Thomas W. Lamont, and George C. Clark, had guaranteed $5,000 toward the first year's expeness of the proposed organization, but solely on condition that the project be approved, not only by the Gynecological Society, but by the profession generally.

A majority of the constituent societies of the Congress promptly responded to the suggestion of the Gynecological Society and the following delegates were appointed:

(1) American Dermatological Association: Dr. S. Pollitzer, Dr. M. F. Engman.
(2) American Surgical Association: Dr. George Brewer, Dr. Joseph Bloodgood, Dr. Charles L. Gibson.
(3) American Laryngological Association: Dr. George B. Wood, Dr. J. Gordon Wilson.
(4) American Otological Society: Dr. Charles W. Richardson, Dr. George E. Shambaugh, Dr. Christian R. Holmes.
(5) American Association of Genito-Urinary Surgeons: Dr. H. A. Fowler, Dr. F. R. Hagner.
(6) American Gynecological Society: Dr. Reuben Peterson, Dr. Edward Reynolds, Dr. Thomas S. Cullen, Dr. Frank F. Simpson, Dr. William E. Studdiford, Dr. Frederick J. Taussig, Dr. Howard C. Taylor, Dr. LeRoy Broun.

(7) American Association of Pathologists and Bacteriologists: Dr. A. S. Warthin, Dr. James Ewing.
(8) American Orthopedic Association: Dr. Reginald H. Sayre, Dr. J. D. Griffith.
(9) American Ophthalmological Society: Dr. Richard A. Reeve, Dr. F. E. Cheney, Dr. Hiram Woods.
(10) American Neurological Association: Dr. Harvey Cushing, Dr. B. Sachs.

These delegates were invited to a meeting at the Harvard Club in New York City on May 22, 1913, at which time the American Society for the Control of Cancer was duly organized and the following declaration of its design and scope embodied in the constitution:

> "To disseminate knowledge concerning the symptoms, diagnosis, treatment, and prevention of cancer, to investigate the conditions under which cancer is found and to compile statistics in regard thereto."

It is but fitting that a movement which traces its origin and so large a part of its prestige with the profession and public to the Congress of 1913 should present on this occasion an acknowledgment of indebtedness to all the co-operating organizations and make some account of methods of work and progress during the last three years.

Plan and Scope.—The purpose of the Society as just stated prescribes two main lines of activity: (1) a campaign of public and professional instruction, and (2) the collection of statistical data. Experimental research, the support of hospitals or clinics, and the care and treatment of individual patients are not contemplated. In extending its influence and carrying on its work, the Society necessarily devotes a large share of its direct efforts to securing the interest of other organizations and forces which are in a position to render assistance in local fields.

Professional Endorsement.—In the months immediately following the formation of the Society under the auspices of this Congress, other prominent professional bodies successively recorded their approval and support of the project. Resolutions of endorsement have been adopted by the American Medical Association, the Clinical Congress of Surgeons, the Western Surgical Association, the Southern Surgical and Gynecological Association, and many state and local medical societies.

Executive Control.—The government of the Society is vested in a Board of Directors which numbers 66 members, including practitioners of recognized standing and prominent and interested lay men and women from many parts of the country. The direction of the work in detail is delegated to an Executive Committee of thirteen Directors including the chairmen of standing committees on organization, membership, finance, publication, and statistics. The professional members of the Board act in conjunction with the Executive Committee as an Advisory Council which formulates the general policies of the Society.

Membership and Finance.—In so far as paid service is necessary to supplement the volunteer work, which is the chief source of the Society's vitality, a modest budget is raised entirely from dues of members at five dollars per annum and from special contributions in larger amounts. The Society has no endowment and no fixed income from any philanthropic foundation. At present there are 577 members and contributors of all classes, approximately half of whom are physicians, the list including some of the leading American practitioners. The interest and support of these doctors is a chief asset of the Society and this opportunity is taken to urge every member of the Congress of Physicians and Surgeons to contribute his influence by becoming an annual member.

State and Local Committees.—Branch committees of the Society are formed in the several states and cities, not as independent local organizations, but as integral parts of the single National Society. The chairmen of state committees are usually members of the National Board of Directors and are vested with full power to appoint the other members of their committees and supervise their work. State committees in turn may organize local committees in the principal centers of population wherever the interest and needs warrant. At the present time state committees have been authorized in sixteen states and several others are in the process of formation.

Organization and Coöperation.—The Society has considered it a matter of first importance to develop its National Executive Office as a central bureau and clearing house through which to seek the coöperation of all appropriate general and local agencies, and to receive and transmit impulses tending to further the propaganda of public instruction in all parts of the country. Standing in close relation, on the one hand, to the leading experimental and statistical students of the disease who represent sources of new and old knowledge of the subject, the Society is, on the other hand, in helpful contact with the various social forces which can be called upon to transmit the essential facts to the public.

Boards of Health.—Widespread and increasingly effective work is being done by state and city boards of health in the direction of instructing the public regarding the prevention of disease. The Society therefore endeavors to have the more progressive health officers devote a proportionate share of attention to cancer in this connection, and the national office undertakes to furnish data, statistics, and special articles produced under the supervision of the appropriate committees, for local use in the name of the board of health. Many health boards, including particularly those of Michigan, Virginia, North Carolina, New York, Massachusetts, Kansas, New York City and Toronto, are now taking an active part in this campaign, while a number of other departments have made a beginning.

Medical Societies and Education of the Profession.—The design of the Society is taken to include efforts to keep the general practitioner in touch with the latest developments in the knowledge of cancer, and cognizant of his duty to the patient. In this field, however, it is felt that the regular professional organizations should take the lead. The Society, therefore, offers all possible coöperation and assistance to state and county medical societies in providing literature and speakers, and to the various medical journals in publishing appropriate articles. Many state societies have appointed special cancer committees, some of these, as in the case of Pennsylvania, antedating the formation of the national organization and representing notable pioneer work in this field in America. In several instances the committee of the National Society and that of the state medical society have been made identical. The existing state committees on health and public instruction have also been approached with reference to the inclusion of cancer in their programs.

Nurses.—Systematic effort is made to promote the instruction of nurses regarding the earlier phases of malignant disease and predisposing conditions, in order that they may be adequately prepared to advise people, especially women with whom they come in contact in the course of their duties, to seek professional attention in time. A series of special articles for nurses has been published, meetings for nurses have been arranged, all the leading schools of nursing in the country have been urged to include in their courses lectures on the early signs and symptoms of cancer, and opportunities are sought to present the subject at the annual meetings of state and national organizations of nurses, a number of which have recorded their endorsement of the purpose and methods of the Society.

Social Workers.—The field workers of charity organization societies have similar opportunities to advise people who do not ordinarily read newspapers and educational books and pamphlets. The National Office has, therefore, circularized several hundred of the larger charity organization societies in the various states, seeking their interest and coöperation in holding public meetings and in arranging for the special instruction of the members of their working forces.

Women's Clubs.—Women's organizations have proven one of the most effective single agencies in disseminating knowledge of early cancer and the conditions leading to the disease. The work of the Society has been brought to the attention of the national and state federations of women's clubs, and the appropriate committee officials have been circularized in order to secure their coöperation in suggesting this topic to local clubs. As a result, women's clubs in many states and cities have frequently taken the lead in arranging public meetings and in providing lectures in their regular study programs.

Insurance Companies. The coöperation of the leading insurance companies is sought, not only in respect to statistical investigations, but for the distribution of educational literature. One of the largest companies has reprinted, at the suggestion of the Society, a cancer leaflet which it is prepared to distribute to the number of two million copies. At the recent meeting of the American Life Convention a resolution was adopted providing for the distribution by insurance companies generally of a brief uniform circular, approved by the Society, to be sent out in premium notice envelopes, thereby reaching many thousands of intelligent people. The Life Extension Institute, which grew out of the educational work of insurance companies, has advised its subscribers regarding the early recognition of cancer, and is indirectly furthering the campaign by its propaganda for periodical physical examinations.

Industrial and Welfare Organizations.—Many of the larger industrial, commercial, and transportation companies have undertaken extensive welfare work and health instruction for the benefit of their employees. The Society has offered to the appropriate officials of these companies any desired assistance in providing speakers and circulars, or suggestions for the preparation of special literature to be distributed by the companies themselves. In this connection the coöperation of such organizations as the National Civic Federation, the National Safety Council, and the American Museum of Safety has been invited.

Newspaper Publicity.—By direct effort and through its local committees and various other agencies already referred to, the Society stimulates the publication of carefully considered newspaper articles. So far as possible, the character of this matter is controlled by the national organization, which sends out in its own press service short articles prepared under the close scrutiny of a committee on publication, made up of professional men of recognized standing. From the beginning, the Society has also had the benefit of the constant advice and coöperation of the Council on Health and Public Instruction of the American Medical Association, and by special arrangement a cancer article has been supplied for each issue of A. M. A. press service, which reaches a selected list of several thousand newspapers. Valuable newspaper publicity has also been secured through the work of some of the leading state and city boards of health, whose statements to the editors on this topic are frequently given better attention and more space than articles sent out by a distant national bureau.

Circulars and Bulletins.—The Society has published for general distribution to the public a number of leaflets giving in simple language the elementary facts about the disease. These circulars are distributed directly on request to the central office or indirectly through local committees. Arrangement has been made to provide these or other approved circulars at small cost to boards of health and other local organizations in a position to purchase and distribute such material.

A series of special bulletins is also published for more limited distribution among members of the Society and those who are directly concerned in organizing local educational campaigns.

Public Meetings and Lectures.—To inaugurate work in each of the more important cities, the coöperation of professional, civic, and religious forces is secured in arranging a general public meeting, at which recognized experts may discuss the various phases of the cancer problem. Perhaps even more effective in reaching the public with the facts are lectures given under various auspices, particularly women's clubs, to small audiences under conditions such that a single speaker can present the subject in a more direct and convincing manner. It is a particular function of local committees to arrange for such lectures. The Society, through its national and branch offices, undertakes to act as a lecture bureau and to provide qualified speakers for meetings in any part of the country.

Statistical Research.—The second principal object of the Society is to organize statistical research on a broader basis than has hitherto been possible. While numerous individuals, clinics, research laboratories, insurance companies, and public health departments have been interested in this field and have done valuable independent work, the Society has now undertaken to coördinate all these agencies for the conduct of special investigations on a larger scale. To this end a Statistical Advisory Board has been formed, which includes thirty representatives of the leading American organizations in the several classes referred to.

National Mortality Statistics.—At the suggestion of the Society the Director of the United States Census has ordered the publication of a special report on the cancer mortality of 1914, which is now in press, and will constitute one of the most important statistical studies of this disease so far made under the auspices of any government. An important advance undertaken in this connection, at the suggestion of a prominent American surgeon, is the distinction made between the figures of deaths in which the diagnosis was reached after autopsy, surgical intervention, or microscopical examination, and those in which the diagnosis was based merely on clinical observations. In addition, the forthcoming report will give the figures in far greater detail than hitherto, and according to 29 separate organs and parts of the body affected instead of under the seven group titles of the International List of Causes of Death as used in the annual reports of the Census Bureau. Much of the improvement with respect to greater detail and accuracy which characterizes this special report will, doubtless, become a permanent feature of the American national statistics of cancer.

Operative Statistics.—The Society has also undertaken the collection and study of records of operations for cancer in numbers approximately as great as those represented in the national mortality statistics. A blank has been prepared by a sub-committee of the Statistical Advisory Board, and leading surgeons throughout the country are asked to coöperate in this study by reporting thereon a few essential facts regarding each case of the disease on which they operate, either in private practice or in hospital service. The records thus obtained will be followed up at intervals of one year by inquiry addressed to the surgeon, and the data will be tabulated and analyzed by expert statistical methods. Any new and definite evidence as to the curability of cancer which may result will be laid before the public in the course of the educational campaign, but any such announcement will be in the name of the Society, and no comparison or publication of the work of individual surgeons will be authorized.

Hospital Records.—The committee on statistics has also prepared a series of more detailed blanks, one for each principal type of malignant disease, on which to record the full history of cases as a basis for careful study of etiological factors. These forms have been put into experimental use, and when perfected will be offered for use in a number of the larger hospitals in the endeavor to bring out important factors surrounding the occurrence of cancer in the individual, in the family, and in the community.

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Correspondence.

AN ERROR OF QUOTATION.

Dorchester, Mass., October 5, 1916.

Mr. Editor: Permit me to call to your attention a slight error in quotation and in authorship. I refer to "In medio tutissimus ibis," which occurs in Dr. F. Fremont-Smith's paper in Boston Medical and Surgical Journal of October 5, 1916. The line is from Ovid's Matamorphoses, II. 137, and not from Virgil.

The complete verse reads: "Inferius terras: medio tutissimus ibis."

Very sincerely,
Wm. B. Batchelder, M.D.

[Note.—This quotation occurred correctly in the issue of the Journal for June 10, 1915 (Vol. clxxii, p. 849). Had the proof of the present article been more carefully read, the error would probably have been detected in this instance.—Editor.]

CHANGES IN THE MEDICAL CORPS, U. S. NAVY, FOR THE THREE WEEKS ENDING OCTOBER 14, 1916.

September 22.

Surgeon H. F. Strine, to Naval Hospital and School, Washington, D. C., September 25, 1916.

Surgeon R. W. Plummer to *Alabama.*

Surgeon G. F. Freeman, detached *Tacoma* to home, wait orders.

P. A. Surgeon H. A. May, detached Marine Barracks, Port Royal, S. C., to home and wait orders.

P. A. Surgeon P. E. Garrison, detached *Dolphin* to duty with Expeditionary Forces in Santo Domingo.

P. A. Surgeon E. H. H. Old, detached Naval Hospital, Washington, D. C., to *Solace.*

P. A. Surgeon D. G. Allen to *Chester.*

September 22.

Surgeon H. C. Curl, detached Force Surgeon, Reserve Force Atlantic Fleet, to Marine Barracks, Port Royal, S. C.

P. A. Surgeon G. B. Trible, to Naval Academy, Annapolis, Md., Sept. 25.

September 23.

P. A. Surgeon E. R. Huff, detached *Scorpion* to home and wait orders.

September 25.

Surgeon C. D. Langhorne, resignation accepted from Sept. 29, 1916.

P. A. Surgeon D. H. Noble, to Naval Hospital, Philadelphia, Pa.

Asst. Surgeon J. H. Brantley, commissioned from August 26, 1916.

Asst. Surgeon A. H. Cecha, commissioned from Aug. 29, 1916.

Asst. Surgeon I. W. Jacobs, commissioned from Aug. 26, 1916.

Asst. Surgeon P. F. Prioleau, commissioned from Aug. 29, 1916.

Asst. Surgeon F. T. Power, commissioned from Aug. 28, 1916.

October 4.

Surgeon C. E. Triebly, detached *North Dakota* to *Illinois.*

Medical Director George B. Wilson died at Boston, Mass., Oct. 1, 1916.

Asst. Surgeon John Harper, detached *Minnesota*, to connection fitting out *Arizona*, and duty on board, when commissioned.

October 5.

Surgeon J. S. Taylor, detached *Rhode Island*, to *Connecticut.*

Surgeon C. G. Smith, detached Bureau of Medicine and Surgery, Navy Department, to fitting out *Arizona*, and on board when commissioned.

Surgeon J. A. Murphy, detached *Michigan*, to Bureau of Medicine and Surgery, Navy Department, Washington, D. C., Oct. 14, 1916.

Asst. Surgeon R. L. Crawford, detached *Connecticut* to *Rhode Island*, Oct. 5.

Medical Director Philip Leach, detached Naval Hospital, New York, to command Naval Hospital, Boston, Mass.

Medical Inspector G. A. Lung, detached Naval Torpedo Station, Newport, R. I., to command Naval Hospital, New York.

Surgeon H. C. Curl, to *Michigan.*

P. A. Surgeon G. R. W. French, detached *Maine*, to Torpedo Station, Newport, R. I.

October 6.

Surgeon H. D. Wilson, to home and wait orders.

P. A. Surgeon J. B. Mears, detached *Memphis*, to Expeditionary Force, Santo Domingo.

ARMY MEDICAL CORPS EXAMINATION.

The Surgeon-General of the Army announces that preliminary examination for appointment to first lieutenants in the Army Medical Corps will be held early in January, 1917, at points to be hereafter designated.

Full information concerning this examination can be procured upon application to the "Surgeon General, U. S. Army, Washington, D. C." The essential requirements to secure an invitation are that the applicant shall be a citizen of the United States, between 22 and 32 years of age at time of receiving commission in Medical Corps, a graduate of a medical school legally authorized to confer the degree of doctor of medicine, of good moral character and habits, and shall have had at least one year's hospital training as an interne, after graduation. Applicants who are serving this post-graduate interneship and can complete same before Oct. 1, 1917, can take the January examination. The examination will be held simultaneously throughout the country at points where boards can be convened. Due consideration will be given to localities from which applications are received, in order to lessen the traveling expenses of applicants as much as possible.

In order to perfect all necessary arrangements for the examination, applications should be forwarded without delay to the Surgeon General of the Army.

There are at present two hundred and twenty-eight vacancies in the Medical Corps of the Army.

NOTICES.

HARVEY SOCIETY LECTURES.—The second lecture of the current twelfth course before the Harvey Society will be given at the New York Academy of Medicine on Saturday evening of this week, November 4, by Dr. F. M. Allen of the Hospital of the Rockefeller Institute on "The Rôle of Fat in Diabetes."

SUFFOLK DISTRICT MEDICAL SOCIETY, CENSORS' EXAMINATION.—The censors of the Suffolk District Medical Society will meet to examine candidates for admission to the Massachusetts Medical Society at the Boston Medical Library, 8 The Fenway, on Thursday, November 9, at 4 P.M.

Candidates, who must be residents of the Suffolk District or non-residents of Massachusetts, should make a personal application, at least three days before the examination, to the Secretary, at 355 Marlborough street, between 4 and 5 o'clock, P.M. (except Saturdays and Sundays), and present their medical diplomas.

DAVID CHEEVER, *Secretary,*
Suffolk District Medical Society.

APPOINTMENTS.

HARVARD MEDICAL SCHOOL.—*Dr. Edward H. Nichols* and *Dr. Charles A. Porter*, formerly associate professors of surgery in the Harvard Medical School, have been appointed clinical professors. The following appointments as assistants have been confirmed: *Dr. Donald M. Glover*, assistant in histology; *Dr. Joseph H. McGuire*, assistant in histology; *Dr. MacIver Woody*, assistant in pathology; *Dr. Harry S. Bernstein*, assistant in pathology; *Dr. Francis L. Burnett*, assistant in pathology; *Dr. George Clymer*, alumni assistant in neurology; *Dr. LeRoy U. Gardner*, instructor in pathology.

RECENT DEATH.

DR. D. BRAYDEN KYLE, who died of pneumonia, on Oct. 23, at Philadelphia, was born at Cadiz, O., in 1853. He received the degree of M.D. from the Eclectic Medical College of Cincinnati, Ohio, in 1891. He was known as a specialist in rhino-laryngology, and has written several text-books on diseases of the nose and throat. He was formerly president of the American Laryngological Association.